Presenter Name: Ekta Anand
Classification: Undergraduate
PI: Kang, Jing-Qiong

Evaluation of 4-Phenylbutyrate rescue on a complex developmental and encephalopathy with MECP2 mutation and GABRA1/GABRG2 deletion in cell and mouse models

Ekta Anand, Aiden Delahany, Emmett Castell, Brayden Zhen, Wangzhen Shen, Karishma Randhave, Ziang Song, Melissa Bassett, Zeljka Lanaghan Miletic, Johathan Meritt, Hongwei Dong, Jeff Neul, Jing- Qiong Kang

Introduction: Both mutations in MECP2 and GABAA receptor subunits can cause epilepsy and neurodevelopmental delay. The major aims of this project is to 1) investigate the underlying pathophysiology for a complex case of developmental and epileptic encephalopathy; 2) to investigate the efficacy of phenylbutyrate (PBA), a proven epileptic drug, on a combined MECP2 and GABA receptor mutation. Based on a clinical encounter, a 2-year-old girl displayed a mutation in the MECP2 protein (L301fs20*), the genetic cause for Rett syndrome, as well as a genomic deletion leading to a loss of one copy of GABA receptors. Using both in vivo and in vitro models, the goal of this project is to identify if treatment with PBA could alter the expression of MECP2 and GABRA1/GABRG2, and if these changes are in a dose-dependent manner as well as the impact on disease outcome. The primary objective of this study was to 1) understand the pathophysiology underlying the complex case of MECP2 mutation and GABRA1/GABRG2 mutation; 2) to develop the most effective treatment options; 3) to test the therapeutic potential of 4-phenylbutyrate (PBA) in restoring GABAA receptor protein; 4) the effect of PBA on MECP2 protein and mitigating disease phenotype.

Methods: To achieve our objective, we generated cDNAs that encode GABAA receptor subunit and the MECP2 mutation. We obtained knockout mice bearing a MECP2 mutation (R294X) that is in the same functional domain and approximate location of the patient mutation MECP(L301fs20*). We first compared transient transfection of the wildtype α1, β2 and γ2 subunit receptors with a full and a half dosage. The α1, β2 and γ2s, the short form of the γ2 subunit are the most abundant subunit isoform in the brain. The brain tissue was extracted from cortex, cerebellum, hippocampus and thalamus of the male and female wildtype and the heterozygous mice. Western blotting was performed to assess protein expression level in different groups.

Results: he significance of this study lies in the potential clinical benefit of PBA in reducing seizures and mitigating neurobehavioral comorbidities in individuals with GABAA receptor subunit gene mutation and MECP2 mutation. Further research will elucidate the relation of MECP2 expression and GABAA receptors and if PBA can be a therapeutic interventions for this complex case of developmental and encephalopathy.

Discussion: he significance of this study lies in the potential clinical benefit of PBA in reducing seizures and mitigating neurobehavioral comorbidities in individuals with GABAA receptor subunit gene mutation and MECP2 mutation. Further research will elucidate the relation of MECP2 expression and GABAA receptors and if PBA can be a therapeutic interventions for this complex case of developmental and encephalopathy.

Keywords (if any): Epilepsy

Presenter Name: Zoe Abel
Classification: Undergraduate
PI: Biggs, Elizabeth

Parent Experiences Supporting Literacy and Play for Children with Complex Communication Needs using Alternative and Augmentative Communication (AAC).

Zoe K. Abel

Introduction: A child's early years are a formative time for the development of communication, including the skills necessary for literacy and play (Kaiser & Trent, 2007). However, many children with disabilities have complex communication needs (CCN) and are unable to use functional speech to communicate. Augmentative and alternative communication (AAC) resources provide these children access to critical communication tools and can improve outcomes (Light et al., 2015). The purpose of this study was to provide insight into the home literacy and play experiences of young children with CCN and their parents learning to use AAC in the form of speech-generating devices (SGDs). Understanding families' lived experiences and perspectives is essential to addressing the challenges they face and improving AAC service delivery and policy (Mandak et al., 2017). This investigation was guided by the following research question: What are home literacy and play experiences like for parents and their young children who are learning to use speech-generating devices?

Methods: The study utilized a concurrent parallel mixed method design (Creswell & Plano-Clark, 2018). Participants included 14 mothers who were parents of a child aged 3-6 who have a disability and are learning to use an SGD. The children had a variety of diagnoses, including Down syndrome, autism, apraxia, and developmental delay. We conducted semi-structured interviews that ranged from 25 to 118 minutes in length (M=58 minutes). Qualitative analysis involved iterative rounds of thematic coding using a team-based, inductive approach to allow findings to emerge from interview transcripts (Thomas, 2006; Saldaña, 2013). Quantitative data analysis involves analysis of descriptive statistics for the child's literacy and play skills and parent teaching across both literacy and play.

Results: Access to AAC and consistent family support is crucial in the development of play and literacy skills in young children with complex communication needs. This study will provide a crucial understanding of the nature of parent-child interactions, parent views and home practices for families using AAC. This knowledge will guide the development and implementation of family-centered models of working with young children learning to use aided AAC.

Discussion: Access to AAC and consistent family support is crucial in the development of play and literacy skills in young children with complex communication needs. This study will provide a crucial understanding of the nature of parent-child interactions, parent views and home practices for families using AAC. This knowledge will guide the development and implementation of family-centered models of working with young children learning to use aided AAC.

Keywords (if any): Alternative and augmentative communication (AAC), family, communication

References (if any):

Kaiser, A. P., Hancock, T. B., & Trent, J . A. (2007). Teaching parents communication strategies. Early Childhood Services: An Interdisciplinary Journal of Effectiveness, 1(2), 107-136.

Mandak, K., O'Neill, T., Light, J., & Fosco, G. M. (2017). Bridging the gap from values to actions: a family systems framework for family-centered AAC services. Augmentative and alternative communication (Baltimore, Md. : 1985), 33(1), 32-41. https://doi.org/10.1080/07434618.2016.1271453

Creswell, J. W., & Plano Clark, V. L. (2018). Designing and Conducting Mixed Methods Research (3rd ed.). Thousand Oaks, CA: SAGE. Thomas, D. R. (2006). A General Inductive Approach for Analyzing Qualitative Evaluation Data. American Journal of Evaluation. https://doi.org/10.1177/1098214005283748

Saldana, J. (2013). The Coding Manual for Qualitative Researchers (2nd ed.). London: Sage.

Presenter Name: Zoha Arif
Classification: Undergraduate
PI: Sophia Vinci-Booher

Microstructural profiles of white matter tracts connecting ventral and dorsal cortex and relation with age

Arif, Z., Pestilli, F., & Vinci-Booher, S.

Introduction: The ventral and dorsal streams are two parallel neural pathways that process visual information. Interactions between these two processing streams change throughout development and may occur through the posterior vertical pathway (PVP), a major white matter pathway that connects cortical regions associated with the ventral and dorsal streams. The PVP can be segmented into at least four tracts: the posterior arcuate (pArc), the middle longitudinal fasciculus connection to the angular gyrus (MDLFang), the temporal-parietal connection to the superior parietal lobe (TPC), and the middle longitudinal fasciculus connection to the superior parietal lobe (MDLFspl).

Methods: We used diffusion tractography and microstructural modeling to characterize the tissue properties of these four PVP tracts in a large cross-sectional sample (n = 492) ranging in age from 3 to 22 years. We estimated the change in tissue microstructure along each tract by plotting fractional anisotropy (FA) along the tract using a tract profiles approach. We then estimated the relationship between age and the microstructure of each tract by identifying the age at which the mean FA of each tract profile reached its peak based on a multiple-variable, non-linear model (i.e., FA~age^2 + sex). This model was selected over simple linear (i.e., FA~age), simple nonlinear (i.e., FA~age^2), and multiple linear (i.e., FA~age + sex) regression models based on the Akaike Information Criterion (AIC) value.

Results: Taken together, results demonstrated that the four PVP tracts have unique microstructural profiles and have different relationships with age, suggesting that segmenting the PVP into these four tracts will yield unique insights into ventral-dorsal interactions throughout development.

Discussion: Taken together, results demonstrated that the four PVP tracts have unique microstructural profiles and have different relationships with age, suggesting that segmenting the PVP into these four tracts will yield unique insights into ventral-dorsal interactions throughout development.

Keywords (if any): Development, White Matter, Action-Perception

Presenter Name: Camille Archer
Classification: Graduate
PI: Kaczkurkin, Antonia

Concurrent and Longitudinal Neurostructural Correlates of Irritability in Children

Camille Archer, Hee Jung Jeong, Gabrielle E. Reimann, E. Leighton Durham, Tyler M. Moore, Amy Milewski, Antonia N. Kaczkurkin

Introduction: Irritability, or an increased proneness to frustration and anger, is among the most common reasons that children are brought in for psychiatric care and is associated with the emergence of anxiety and depression. However, few studies have examined potential neurostructural correlates of irritability. The purpose of the current study was to examine associations between regional gray matter volume, cortical thickness, and irritability in a large sample of children.

Methods: Participants included 9- to 10-year-old children (N = 10,647) from the Adolescent Brain Cognitive DevelopmentSM Study (ABCD Study®). Data from the baseline and first-year follow-up time points were used for analyses. A latent measure of irritability was derived using items from the Child Behavior Checklist. We related irritability to gray matter volume and cortical thickness in 68 cortical and 19 subcortical regions using structural equation modeling. Multiple comparisons were adjusted for using the false discovery rate (FDR).

Results: The current study demonstrates inverse associations between irritability and volume in regions implicated in emotional processing/social cognition, attention allocation, and movement/perception. These findings support theories positing socioemotional deficits as a key feature of irritability and demonstrate that neurostructural differences associated with irritability are apparent at an early age.

Discussion: The current study demonstrates inverse associations between irritability and volume in regions implicated in emotional processing/social cognition, attention allocation, and movement/perception. These findings support theories positing socioemotional deficits as a key feature of irritability and demonstrate that neurostructural differences associated with irritability are apparent at an early age.

Keywords (if any): Irritability, brain structure, youth

Presenter Name: Kathryn Babbitt
Classification: Undergraduate
PI: Park, Sohee

Embodiment of Trauma is Associated with Psychosis Risk in the General Population

Kathryn Babbitt, Michael Sangimino, Sohee Park

Introduction: The role of childhood trauma in schizophrenia and ultra-high-risk populations is well-established, but its relationship with psychosis proneness in the general population remains less clear. Considering the substantial prevalence of childhood trauma in the U.S. (43%), this research aimed to examine the impact of trauma on psychosis risk in healthy individuals.

Methods: Study 1 was an anonymous online survey (n=103), incorporating the Brief Trauma Questionnaire (BTQ) and the Prodromal Questionnaire-16 (PQ-16). Study 2, conducted in person, extended the investigation with the same questionnaires and introduced a novel body mapping tool to identify physical sensations related to trauma. Data analysis involved Spearman correlations, and the creation of boy maps included specific guidelines for scoring body maps.

Results: The results from the two studies reinforce the previously established relationship between childhood trauma and psychosis risk, highlighting the major role of trauma as a risk factor in serious mental disorders like schizophrenia. Additionally, these findings suggest the existence of a potential third factor, likely associated with reduced resilience, which impacts participants. Specifically, meeting clinical PTSD standards post-trauma appears to be linked to greater distress in any expressed prodromal symptoms. This underscores a complex connection between trauma, psychosis risk, and psychological resilience. Future research should delve into specific types of trauma and explore potential resilience factors that could influence psychosis risk further.

Discussion: The results from the two studies reinforce the previously established relationship between childhood trauma and psychosis risk, highlighting the major role of trauma as a risk factor in serious mental disorders like schizophrenia. Additionally, these findings suggest the existence of a potential third factor, likely associated with reduced resilience, which impacts participants. Specifically, meeting clinical PTSD standards post-trauma appears to be linked to greater distress in any expressed prodromal symptoms. This underscores a complex connection between trauma, psychosis risk, and psychological resilience. Future research should delve into specific types of trauma and explore potential resilience factors that could influence psychosis risk further.

Keywords (if any): Trauma, Psychosis Risk

Presenter Name: Eshani Arumalla
Classification: Undergraduate
PI: Cascio, Carissa

Contrasting Pain Expression and Perception through Spontaneous Facial Expression in Autistic Individuals and Neurotypicals

Jennifer M. Quinde, Michelle D. Failla

Introduction: This study aimed to assess the link between pain expression and perception in autistic and neurotypical individuals while addressing the ongoing debate about whether autistic individuals exhibit hypersensitivity or hyposensitivity towards pain. Pain evaluation in autistic people is further complicated by their social communication limitations. A novel manner of identifying and quantifying pain perception that does not majorly rely on verbal report is behavioral coding methods such as Facial muscle-based Action Unit (AU) Analysis that are defined by the Facial Action Coding System (FACS). Following recent literature outlining tactile hypersensitivity in autism and increased neuronal response to painful stimuli, we hypothesized that autistic individuals would show increased facial response to painful stimuli compared to neurotypical controls.

Methods: 36 adults, whose ages ranged from 20- 47 years (M= 28.36, SD= 6.79) with 53% identified as female and 50% with an Autism diagnosis, were recruited to perform a sustained pain task which exposed participants to alternating warm (42℃) and hot (46℃) thermal stimuli (6 trials each, 21 seconds, 30 seconds in between each trial). Following every trial of the sustained pain task, the participants used the VAS scale to rate their pain (which had embedded anchors of no pain, worst pain). Engagement was measured in terms of time percent with iMotions software during the sustained pain task and post-processed with Affectiva's AFFDEX emotion recognition software. A linear mixed effects analysis was run on R v.4.2.2 to draw conclusions about the correlation between Engagement time percent and VAS ratings.

Results: When changing the trials from warm to hot stimuli, autistic individuals emoted more and had increased facial expression. Neurotypicals have decreased ratings and Engagement Time Percent for warm trials and when the trials are hot, the pain rating increases but facial engagement does not. These general trends indicated hypersensitivity amongst autistic individuals. Further studies are required to consolidate relationships between participant diagnosis, stimulus temperature, Engagement, and VAS pain ratings to address limitations surrounding interactions between these variables.

Discussion: When changing the trials from warm to hot stimuli, autistic individuals emoted more and had increased facial expression. Neurotypicals have decreased ratings and Engagement Time Percent for warm trials and when the trials are hot, the pain rating increases but facial engagement does not. These general trends indicated hypersensitivity amongst autistic individuals. Further studies are required to consolidate relationships between participant diagnosis, stimulus temperature, Engagement, and VAS pain ratings to address limitations surrounding interactions between these variables.

Keywords (if any): Autism Spectrum Disorder, Pain Perception, Spontaneous Facial Expression Production

Presenter Name: Vaishnavi Bavadekar
Classification: Research staff
PI: Niswender, Colleen

A Goldilocks Gene: Overexpression of mGlu7 Results in Overlapping Phenotypes with mGlu7 Knockout Mice

Vaishnavi M. Bavadekar, James R. Melchior, Kelly Weiss, Zixiu Xiang, Colleen M. Niswender

Introduction: Rett Syndrome (RTT) is a neurodevelopmental disorder involving cognitive impairments and deficits in long-term potentiation (LTP) at the Schaffer Collateral-CA1 (SC-CA1) region in the hippocampus. Deficits in LTP can be correlated to metabotropic glutamate receptor 7 (mGlu7), localized to presynaptic terminals in the SC-CA1 region, as its activation is critical for LTP in this region (Klar et al., 2015; Gogliotti et al., 2017). Previous studies demonstrated that mutations in the Methyl CpG Binding Protein 2 (MECP2) gene resulted in reduced mGlu7 expression impairing mGlu7-mediated control of synaptic transmission in mice (Gogliotti et al., 2017). By overexpressing mGlu7, we hypothesized that these mGlu7-mediated functions would be restored and differences in field excitatory postsynaptic potential (fEPSP) responses to L-AP4, an orthosteric agonist of mGlu7, and behavioral tests would be evident between transgenic and wild-type (WT) mice.

Methods: To characterize these mice, a series of behavioral tests and fEPSP recordings were conducted in mice bred to overexpress either the mGlu7A or mGlu7B splice variants of mGlu7 and their littermate WTs. The elevated zero maze (EZM) tested for changes in anxiety-related behaviors, while hindlimb clasping tested for restrictive movement, a common phenotype in RTT. To test the impact of mGlu7 overexpression on associative learning and memory, mice underwent a two-day contextual fear conditioning test (CFC). The first day involved training mice to associate the testing environment with an aversive foot-shock stimulus. After 24 hours, the mice were returned to the testing environment without any aversive shock administration and observed to measure freezing behavior as an indication of memory. fEPSP responses to L-AP4 were recorded in mice aged between six to eight weeks by stimulating axons of pyramidal cells and recording dendritic glutamate release in the SC-CA1 region.

Results: The lack of an enhanced L-AP4 response in fEPSP recordings among mice overexpressing mGlu7 could be explained by the compensatory contribution of GABAergic neurons in minimizing effects of overexpressing models. To control for these effects, additional fEPSP recordings will be conducted using bicuculline, a GABA blocker. Additionally, the observation that mice over- and under-expressing mGlu7 exhibit similar behavioral phenotypes suggests that the level of mGlu7 must be tightly controlled. Supported by grant MH124671.

Discussion: The lack of an enhanced L-AP4 response in fEPSP recordings among mice overexpressing mGlu7 could be explained by the compensatory contribution of GABAergic neurons in minimizing effects of overexpressing models. To control for these effects, additional fEPSP recordings will be conducted using bicuculline, a GABA blocker. Additionally, the observation that mice over- and under-expressing mGlu7 exhibit similar behavioral phenotypes suggests that the level of mGlu7 must be tightly controlled. Supported by grant MH124671.

Keywords (if any): mGlu7, Rett Syndrome

References (if any):

Gogliotti, R. G., Senter, R. K., Fisher, N. M., Adams, J., Zamorano, R., Walker, A. G., Blobaum, A. L., Engers, D. W., Hopkins, C. R., Daniels, J. S., Jones, C. K., Lindsley, C. W., Xiang, Z., Conn, P. J., & Niswender, C. M. (2017). mGlu7 potentiation rescues cognitive, social, and respiratory phenotypes in a mouse model of Rett syndrome. Science translational medicine, 9(403), eaai7459. https://doi.org/10.1126/scitranslmed.aai7459

Klar, R., Walker, A. G., Ghose, D., Grueter, B. A., Engers, D. W., Hopkins, C. R., Lindsley, C. W., Xiang, Z., Conn, P. J., & Niswender, C. M. (2015). Activation of Metabotropic Glutamate Receptor 7 Is Required for Induction of Long-Term Potentiation at SC-CA1 Synapses in the Hippocampus. The Journal of neuroscience : the official journal of the Society for Neuroscience, 35(19), 7600-7615. https://doi.org/10.1523/JNEUROSCI.4543-14.2015

Presenter Name: Joanna Bellan
Classification: Research staff
PI: Taylor, Julie Lounds

Service Reception and Unmet Needs for Transition-Aged Youth with Autism

Joanna Bellan, Carly Moser, Ph.D., Meghan Burke, Ph.D., Leann DaWalt, Ph.D., & Julie Lounds Taylor, Ph.D

Introduction: The transition from school-based to the adult service system is often challenging for families of youth with autism (Laxman et al., 2019; Taylor et al., 2015). Existing research on service access prior to and following high school exit commonly focuses on a few service types or single geographic location (Ishler et al., 2022; Schott et al., 2020; Shattuck et al., 2011; Vogan et al., 2017). Our study expands on current research by assessing a broad range of services across three states to capture differences in service receipt and unmet service needs for youth in and out of high school.

Methods: Participants were 185 parents of transition-aged autistic youth (16-26 years) from three states (TN, IL, and WI) who were part of a larger randomized controlled trial. Data on service access was collected via parent interviews at baseline. Interviewers asked about 20 services using questions from the National Longitudinal Transition Study-2 in areas of vocational/educational support, functional skills, housing/transport, physical/mental health, and service navigation. Parents were asked if they were receiving the service, and if not, they were asked if the service was needed. Proportions of the sample receiving each service and reporting each service as an unmet need were calculated, and service differences between youth in and out of high school were examined via Fisher's exact tests.

Results: Our results are consistent with previous research demonstrating reduction in services following high school exit (Laxman et al., 2019 ; Shattuck et al., 2011; Platos & Pasula, 2019) and adds to current research by identifying which specific services are less likely to be accessed after high school. By obtaining detailed information about multiple services, we capture a more nuanced picture of the service landscape for transitioned-aged youth with autism (Burke et al., 2023; Shattuck et al., 2020). Future directions include examining predictors of service access and satisfaction levels of service receipt.

Discussion: Our results are consistent with previous research demonstrating reduction in services following high school exit (Laxman et al., 2019 ; Shattuck et al., 2011; Platos & Pasula, 2019) and adds to current research by identifying which specific services are less likely to be accessed after high school. By obtaining detailed information about multiple services, we capture a more nuanced picture of the service landscape for transitioned-aged youth with autism (Burke et al., 2023; Shattuck et al., 2020). Future directions include examining predictors of service access and satisfaction levels of service receipt.

Keywords (if any): Autism, Transition-Age, Service Access

References (if any):

Burke, M. M., Cheung, W. C., Best, M., DaWalt, L. S., & Taylor, J. L. (2023). Measuring what Matters: Considerations for the Measurement of Services for Individuals with Autism. Journal of Developmental and Physical Disabilities. https://doi.org/10.1007/s10882-023-09916-6

Ishler, K. J., Biegel, D. E., Wang, F., Olgac, T., Lytle, S., Miner, S., Edguer, M., & Kaplan, R. (2022). Service Use Among Transition-Age Youth with Autism Spectrum Disorder. Journal of Autism and Developmental Disorders, 52(3), 1051-1065. https://doi.org/10.1007/s10803-021-04999-6

Laxman, D. J., Taylor, J. L., DaWalt, L. S., Greenberg, J. S., & Mailick, M. R. (2019). Loss in services precedes high school exit for teens with autism spectrum disorder: A longitudinal study. Autism Research, 12(6), 911-921. https://doi.org/10.1002/aur.2113

Płatos, M., & Pisula, E. (2019). Service use, unmet needs, and barriers to services among adolescents and young adults with autism spectrum disorder in Poland. BMC health services research, 19(1), 587. https://doi.org/10.1186/s12913-019-4432-3

Schott, W., Nonnemacher, S., & Shea, L. (2021). Service Use and Unmet Needs Among Adults with Autism Awaiting Home- and Community-Based Medicaid Services. Journal of Autism and Developmental Disorders, 51(4), 1188-1200. https://doi.org/10.1007/s10803-020-04593-2

Shattuck, P. T., Garfield, T., Roux, A. M., Rast, J. E., Anderson, K., Hassrick, E. M., & Kuo, A. (2020). Services for Adults With Autism Spectrum Disorder: a Systems Perspective. Current psychiatry reports, 22(3), 13. https://doi.org/10.1007/s11920-020-1136-7

Shattuck, P. T., Wagner, M., Narendorf, S., Sterzing, P., & Hensley, M. (2011). Post-high school service use among young adults with an autism spectrum disorder. Archives of pediatrics & adolescent medicine, 165(2), 141-146. https://doi.org/10.1001/archpediatrics.2010.279

Taylor, J. L., & Henninger, N. A. (2015). Frequency and correlates of service access among youth with autism transitioning to adulthood. Journal of Autism and Developmental Disorders, 45(1), 179-191. https://doi.org/10.1007/s10803-014-2203-x.

Vogan, V., Lake, J. K., Tint, A., Weiss, J. A., & Lunsky, Y. (2017). Tracking health care service use and the experiences of adults with autism spectrum disorder without intellectual disability: A longitudinal study of service rates, barriers and satisfaction. Disability and health journal, 10(2), 264-270. https://doi.org/10.1016/j.dhjo.2016.11.002

Presenter Name: Allison Bireley
Classification: Graduate
PI: McDaniel, Jena

Are SLPs Prepared to Serve Deaf and Hard of Hearing Children? Investigating the Needs of Service Providers

Allison Bireley, Jena McDaniel, C. Melanie Schuele

Introduction: Many deaf and hard of hearing (DHH) children receive therapy from speech and language pathologists (SLPs). However, not all SLPs are prepared to meet the unique communication and educational needs of DHH students, which presents a concern due to the proven need for early access to strong language foundations in order to acquire age-appropriate language and literacy. To support interdisciplinary professionals in serving DHH students, the gaps in professional education and training must be identified and addressed through targeted efforts specific to the needs of DHH children.

Methods: We recruited 27 SLPs (mean years of experience = 10.5, mean age = 36.6) who attended a conference about school SLP practices. SLPs were encouraged to participate regardless of direct experience working with DHH children; 10 participants reported no service to DHH children in the previous school year and most served few if any DHH children over the last 5 school years. Participants rated their service to DHH children as it relates to confidence, previous knowledge and training, and desired resources for future service provision. Participants rated each statement using a 4-point likert scale between 1 (none) and 4 (very).

Results: Of the strengths and weaknesses identified by SLPs, participants indicated limited knowledge and confidence for assessing and treating DHH children, suggesting a critical gap in the training of professionals for a population that requires substantial communication support for future success. SLPs were more confident with technology commonly referenced in graduate coursework and seen in adult populations (hearing aids, cochlear implants) but identified a need for further education in serving DHH children with less common technology (e.g., BAHAs, CART) and younger children (birth-3). Overall, the findings highlight the need for continued efforts to improve SLP services for DHH children, including training and resources that boost provider confidence and knowledge in the workplace.

Discussion: Of the strengths and weaknesses identified by SLPs, participants indicated limited knowledge and confidence for assessing and treating DHH children, suggesting a critical gap in the training of professionals for a population that requires substantial communication support for future success. SLPs were more confident with technology commonly referenced in graduate coursework and seen in adult populations (hearing aids, cochlear implants) but identified a need for further education in serving DHH children with less common technology (e.g., BAHAs, CART) and younger children (birth-3). Overall, the findings highlight the need for continued efforts to improve SLP services for DHH children, including training and resources that boost provider confidence and knowledge in the workplace.

Keywords (if any): Deaf and Hard of Hearing, Speech and language, SLP

Presenter Name: Ashley Boyne
Classification: Graduate
PI: Lense, Miriam

Parental social comfort and music background predict the home music environment in early childhood

Ashley Boyne, Camila Alviar, Miriam Lense

Introduction: Music-making is a social activity, fostering connections among individuals. Parents often use music to interact with their young children as a way to entertain, regulate arousal, and share emotions (Nguyen et al., 2023), which supports parent-child bonding, emotion regulation and language development (Lopez et al., 2023). Generally, adults' involvement in formal musical activities has been linked to personality traits: for example, public performances require more extraversion (Ruth et al., 2023). However, there is a lack of research exploring the personality and motivation factors that relate to informal parent-child music-making during early childhood. In this study, we explored the role of parental social comfort and musical background in early parent-child music engagement.

Methods: We analyzed secondary data from 44 caregiver/infant dyads. Parents reported on the parent-child home music environment using the validated Music@Home questionnaire (Politimou et al., 2018) at up to four timepoints (9, 12, 18, and 36 months of age), and reported on their musical training and social comfort at study entry. We used mixed models to assess parental social comfort and number of formal music training years as predictors of the home music environment and its subcategories: parental beliefs about the importance of music exposure, child active music engagement, parent-initiated singing, and parent-initiated music-making, controlling for maternal education level and child age.

Results: Parents' social comfort was a stronger and more consistent predictor of the home music environment - overall and across subcategories - than was musical training. Parent social motivation is a key facilitator of parent-child music engagement, highlighting that music engagement in early childhood is fundamentally a social experience. Child age was a significant predictor for child active engagement and parent-initiated music making, suggesting that the overall home musical environment is relatively stable in early childhood, with parents and children switching active roles as children's autonomy, motor skills, and communication skills develop. Future research will explore how child-related variables, such as temperament, affect early parent-child musical engagement, and how the social use of music in early childhood impacts communication development.

Discussion: Parents' social comfort was a stronger and more consistent predictor of the home music environment - overall and across subcategories - than was musical training. Parent social motivation is a key facilitator of parent-child music engagement, highlighting that music engagement in early childhood is fundamentally a social experience. Child age was a significant predictor for child active engagement and parent-initiated music making, suggesting that the overall home musical environment is relatively stable in early childhood, with parents and children switching active roles as children's autonomy, motor skills, and communication skills develop. Future research will explore how child-related variables, such as temperament, affect early parent-child musical engagement, and how the social use of music in early childhood impacts communication development.

Keywords (if any): music engagement, early childhood, social comfort

References (if any):

Lopez, K.L., Kathios, N., Gabard-Durnam, L.J., & Loui, P. (2023). Music@Home retrospective: A new measure to retrospectively assess early home musical environments [Preprint]. https://doi.org/10.31234/osf.io/csn2m

Nguyen, T., Reisner, S., Lueger, A., Wass, S.V., Hoehl, S., & Markova, G. (2023). Sing to me, baby: Infants show neural tracking and rhythmic movements to live and dynamic maternal singing [Preprint]. https://doi.org/10.1101/2023.02.28.530310

Politimou, N., Stewart, L., Müllensiefen, D., & Franco, F. (2018). Music@Home: A novel instrument to assess the home musical environment in the early years. PLOS ONE, 13(4), e0193819. https://doi.org/10.1371/journal.pone.0193819

Ruth, N., Tsigeman, E., Likhanov, M., Kovas, Y., & Müllensiefen, D. (2023). Personality and engagement with music: Results from network modeling in three adolescent samples. Psychology of Music, 51(4), 1223-1242. https://doi.org/10.1177/03057356221135346

Presenter Name: Abigail Blum
Classification: Graduate
PI: Humphreys, Kathryn

Division of child care labor: How prenatal expectations and postnatal experiences relate to satisfaction with life goals and couple relationships

Abigail Blum, Whitney Barnett, Lauren G. Bailes, & Kathryn L. Humphreys

Introduction: The unequal division of child care labor between parents is well-documented, yet, few studies have investigated this alongside prenatal expectations. Drawing on expectations theory, which emphasizes the importance of alignment between expectations and reality, we examine expectations and division of child care labor on both first-time and multiparous parents' satisfaction with life goals and perceived partner responsiveness.

Methods: Participants were 218 pregnant persons (M age=31.45, SD=4.72) at the prenatal session; approximately half (58%) were primiparous. We prospectively assessed expectations of the division of child care during pregnancy and reported actual division of child care labor at 1 and 6 months postpartum and tested associations between that division and satisfaction with life goals as well as partner responsiveness at 6 months.

Results: Findings indicate the importance of both division of labor and pre-child attitudes for partner responsiveness and satisfaction with life goals in the postnatal period.

Discussion: Findings indicate the importance of both division of labor and pre-child attitudes for partner responsiveness and satisfaction with life goals in the postnatal period.

Keywords (if any): child care, expectations, partner responsiveness

Presenter Name: Kimberly Bress
Classification: Graduate
PI: Cascio, Carissa

Does sensorimotor integration across the upper-lower and right-left face halves occur at the level of the cortex?

Kimberly Bress, Carissa Cascio

Introduction: Facial expression is a complex sensorimotor behavior which requires coordinated action across both the upper-lower and right-left face halves. Facial expressions which accurately represent one's internal sensations and emotions are critical for social communication. Facial expression differences are commonly observed in autism and contribute significantly to social communication challenges. These differences may be related to sensorimotor deficits in autism; however, the exact neural mechanisms remain unknown. While integration of facial sensory input with corticobulbar facial motor control pathways is necessary for control of facial expression, it is unclear at what level(s) of the nervous system this integration occurs.

Methods: In this study, resting state functional magnetic resonance images (fMRI) were acquired from n=59 typically-developing and n=71 autistic adults. Seed-based resting state connectivity analysis was performed to interrogate pairwise connections between the upper and lower somatotopic face areas of the primary sensory (S1) and primary motor (M1) cortices.

Results: These data suggest that while sensory information from the upper face is integrated with motor control of the upper and lower face at the level of the cortex, sensory information from the lower face may not be integrated with motor control of the upper face at the level of the cortex. Preserved somatotopic specificity in lower face S1-to-M1 projections may reflect the involvement of the lower face in more complex actions such as vocalization and mastication, necessitating fine sensorimotor control. Repetition of this analysis with a larger autistic sample is necessary to confirm findings. Future directions will also address integration between sensory thalamic nuclei and cortex.

Discussion: These data suggest that while sensory information from the upper face is integrated with motor control of the upper and lower face at the level of the cortex, sensory information from the lower face may not be integrated with motor control of the upper face at the level of the cortex. Preserved somatotopic specificity in lower face S1-to-M1 projections may reflect the involvement of the lower face in more complex actions such as vocalization and mastication, necessitating fine sensorimotor control. Repetition of this analysis with a larger autistic sample is necessary to confirm findings. Future directions will also address integration between sensory thalamic nuclei and cortex.

Keywords (if any): Autism, Communication, Sensorimotor

Presenter Name: Andrea Burgess
Classification: Graduate
PI: Cutting, Laurie

Functional connectivity during passage listening predicts later reading ability in middle childhood

Andrea N. Burgess, Laurie E. Cutting

Introduction: Children's early behavioral listening comprehension is highly predictive of their later reading abilities. However, less is known about the underlying neural mechanisms of these established behavioral relationships. In particular, we are interested in isolating activity related to high-level comprehension regions, such as the left posterior superior temporal gyrus (pSTG), and understanding how those areas are functionally connected to the rest of the brain. The current study investigates the neural correlates of passage listening in a cohort of first-grade children, and how that functional architecture predicts longitudinal reading comprehension (RC) ability.

Methods: To explore these associations, we collected fMRI data from 47 typically developing first-graders (age M = 7.5 years) and tracked their RC ability into third grade. During the fMRI session, children listened to 1) coherent narrative and expository passages and 2) matched, scrambled phrases baseline. We explored functional activation patterns for the coherent listening task compared to the scrambled phrases baseline and additionally investigated functional connectivity associations between the language network and other brain regions using a seed-to-voxel connectivity analysis.

Results: We hypothesize that while listening to coherent speech, the way children's brains activate core comprehension processing regions and inhibit task-irrelevant implicates their later reading abilities. Additionally, we speculate that this functional relationship is likely to change as children gain more reading experience. Further analyses will elucidate these longitudinal relationships and how the modularity of these two networks may further explain reading development.

Discussion: We hypothesize that while listening to coherent speech, the way children's brains activate core comprehension processing regions and inhibit task-irrelevant implicates their later reading abilities. Additionally, we speculate that this functional relationship is likely to change as children gain more reading experience. Further analyses will elucidate these longitudinal relationships and how the modularity of these two networks may further explain reading development.

Keywords (if any): Reading development, Language, fMRI

Presenter Name: Christina Burroughs
Classification: Postdoc
PI: Corbett, Blythe

Associations Between Executive Functioning Impairments and Anxiety Symptoms among Youth with Autism Spectrum Disorder

Christina Burroughs, Rachael Muscatello, Blythe Corbett

Introduction: Many people with autism spectrum disorder (ASD) experience executive functioning (EF) impairments, and its widely acknowledged that EF difficulties play a significant role in ASD. EF also plays an important role in mental health, as previous studies have demonstrated a relationship between everyday EF difficulties and co-occurring psychiatric symptoms. Anxiety symptoms are among the most prevalent and impairing challenges for autistic youth, and emerging evidence suggests EF impairments exacerbate anxiety for autistic youth. As no prior study has examined how everyday EF impairments are related to specific anxiety symptoms in autistic youth, this study seeks to address this gap.

Methods: Participants included 126 youth 10-13.5-years-old with ASD. Parents of participants reported on symptoms of EF impairment and anxiety on the Behavior Rating Inventory of Executive Functioning (BRIEF-2; Gioia et al., 2015) and the Multidimensional Anxiety Scale for Children (MASC-2; March, 2013), respectively. Hierarchical multiple linear regressions were conducted to examine the associations among demographic/clinical characteristics, types of EF impairment (assessed via BRIEF-2 Index T-sores), and anxiety symptoms (assessed via MASC-2 Total T-scores). Independent variables included age, IQ, and ASD severity entered at step 1, behavioral dysregulation entered at step 2, emotional dysregulation entered at step 3, and cognitive dysregulation entered at step 4. Dependent variables included: separation anxiety/phobias, generalized anxiety, social anxiety, obsessive-compulsive symptoms, physical symptoms, and harm avoidance.

Results: This is the first study to explore how EF impairments are associated with specific anxiety symptoms in autistic youth. EF problems with emotion modulation and flexibility (e.g., tolerating change, changing focus) were associated with most anxiety symptoms assessed. This finding is unsurprising and underscores the importance of targeting the cognitive distortions (e.g., black-and-white thinking, catastrophizing) that exacerbate behavioral rigidity within a cognitive-behavioral framework for autistic youth. Problems with inhibition and self-monitoring were predictive of obsessive-compulsive symptoms, physical symptoms, and harm avoidance. Difficulties identifying/resisting urges and understanding how behaviors relate to outcomes may lead some individuals to engage in non-functional behaviors, display hypervigilance in the absence of threat, and over-interpret physical indicators of anxiety. Lastly, difficulties generating problem-solving strategies and monitoring thoughts/behaviors amid physical symptoms and perceived threat hinder adaptive coping. Treatment implications are discussed.

Discussion: This is the first study to explore how EF impairments are associated with specific anxiety symptoms in autistic youth. EF problems with emotion modulation and flexibility (e.g., tolerating change, changing focus) were associated with most anxiety symptoms assessed. This finding is unsurprising and underscores the importance of targeting the cognitive distortions (e.g., black-and-white thinking, catastrophizing) that exacerbate behavioral rigidity within a cognitive-behavioral framework for autistic youth. Problems with inhibition and self-monitoring were predictive of obsessive-compulsive symptoms, physical symptoms, and harm avoidance. Difficulties identifying/resisting urges and understanding how behaviors relate to outcomes may lead some individuals to engage in non-functional behaviors, display hypervigilance in the absence of threat, and over-interpret physical indicators of anxiety. Lastly, difficulties generating problem-solving strategies and monitoring thoughts/behaviors amid physical symptoms and perceived threat hinder adaptive coping. Treatment implications are discussed.

Keywords (if any): autism, anxiety, executive functioning

References (if any):

Gioia G. A., Isquith P. K., Guy S. C., Kenworthy L. (2015). Behavior Rating Inventory of Executive Function®, Second Edition (BRIEF®2). Lutz, FL: PAR Inc. March J. S. (2013). Multidimensional Anxiety Scale for Children-2nd edition: Technical manual. Toronto, Ontario, Canada: Multi-Health Systems.

Presenter Name: Sarah-Ashby Calhoun
Classification: Graduate
PI: Hodapp, Robert

Church Ministers' Views on Making Places of Faith More Inclusive

Sarah-Ashby Calhoun, Robert Hodapp

Introduction: Like all children, children with disabilities long to be a part of their community. Places of faith are integral in such community engagement, yet not all churches practice inclusivity. Those who do include children with disabilities provide a supportive and empowering space for these children. This study examines church leaders and ministers to identify which resources might help them to include children with disabilities in their Sunday School classes.

Methods: Through a set of questions developed in consultation with ministers, we examined churches across the nation and their inclusion of children with disabilities in their Sunday School classrooms. Ministers were contacted via email, after which they set up a Zoom interview time. To help us gain insight into how churches can actively include children with disabilities, ministers answered questions about barriers, successful strategies, resources utilized, advice received, and collaboration techniques.

Results: When a minister begins to become more inclusive in the Sunday School classroom, offering a space for children with disabilities, the concepts mentioned above become vital. Indeed, one cannot support and encourage children with disabilities without knowing the basics of how to care for them. In addition to discussing in depth each concept, this study also lists free and easily accessible resources to help ministers become more educated. These resources include trainings, pamphlets, and organizations, each of which will expand the minister's knowledge on how to become more inclusive.

Discussion: When a minister begins to become more inclusive in the Sunday School classroom, offering a space for children with disabilities, the concepts mentioned above become vital. Indeed, one cannot support and encourage children with disabilities without knowing the basics of how to care for them. In addition to discussing in depth each concept, this study also lists free and easily accessible resources to help ministers become more educated. These resources include trainings, pamphlets, and organizations, each of which will expand the minister's knowledge on how to become more inclusive.

Keywords (if any): Places of Faith and Disability

Presenter Name: Caden Carter
Classification: Research staff
PI: Cutting, Laurie

Exploring the Impact of Emotional Charge and Socialness of Words in Text on Reading Comprehension Outcomes as an Interaction with ADHD Symptoms

Caden J. Carter, Sarah S. Hughes-Berheim, Tin Q. Nguyen, Laurie E. Cutting

Introduction: How text properties (e.g., word frequency) and reader characteristics interact and, in turn, impact reading comprehension (RC) has long been of interest. Prior studies have identified key text properties that influence how difficult a text is to read, including word frequency, sentence length, and cohesion. Studies have shown that the emotional charge of words in texts also impacts RC. Prior studies have also identified children with elevated ADHD symptoms as more likely to struggle with reading comprehension and self-regulating their emotion. The current study examined how various word-level text metrics of emotional charge and socialness interact with ADHD symptoms to predict RC.

Methods: RC in 158 native English-speaking 8-11-year-olds was measured using the Gates-MacGinitie Reading Test; children's word-level and oral language comprehension processes were also assessed. ADHD symptoms, broken down into inattention, hyperactivity, and a combined measure, were measured using The SWAN Rating Scale, Conners-3 Parent Survey, and Dupaul-5 ADHD Rating Scale Parent Survey. Text features of the Gates-MacGinitie passages were measured using Coh-Metrix 3.0, Linguistic Inquiry and Word Count (LIWC), and Textual Affective Properties Analyzer (TAPA) software. Next, generalized linear mixed-effects regression analysis was used to examine the impact of emotional and social word-level text features on RC after controlling for the central Coh-Metrix indices (narrativity, word concreteness, syntactic complexity, and referential and deep cohesion) and each child's word-level and oral language skills. Further, to address the central research question, an interaction term was added to the regression models to examine how the emotional and social word-level text features as measured using TAPA and LIWC interacted with ADHD symptoms to predict RC.

Results: These findings add to a growing body of research on how text features work in conjunction with reader characteristics to contribute to RC. These findings are helpful for understanding why readers with ADHD symptoms may struggle with reading comprehension.

Discussion: These findings add to a growing body of research on how text features work in conjunction with reader characteristics to contribute to RC. These findings are helpful for understanding why readers with ADHD symptoms may struggle with reading comprehension.

Keywords (if any): Reading comprehension, ADHD, text characteristics

Presenter Name: Amar Camara
Classification: Undergraduate
PI: Kaczkurkin, Antonia

Brain structure of children in single-parent households: Beyond SES

Amar S. Camara, Camille Archer, Cindy Jaramillo, Myrsine Kostoulas, Antonia N. Kaczkurkin

Introduction: Parental socioeconomic status (SES), a combination of a parent's education status and their income, has been shown to have an association with a child's brain development and outcomes in areas such as cognitive ability, executive functions, as well as school achievement and mental health. However, little research has looked at the effects of living in a single-parent household on a child's brain development independent from SES, due to the assumption that they are one in the same. The early cumulative risk exposure that children in single-parent households face creates a unique set of disadvantages that can cause a host of cognitive impairments across development. The current study examines whether living in a single-parent household influences brain structure differences above and beyond SES, in other words, while controlling for SES.

Methods: Participants in the study included 9,450 children (mean age of participants = 9.92, standard deviation = 0.63) of either single-parent or two-parent households. To look at the differences in these children, several analyses were performed. First, t-tests were conducted to investigate whether there was a relationship between 1) marital status and parental education and 2) marital status and household income. Second, structural equation modeling was used to examine the relationship between marital status and gray matter volume in 68 cortical and 19 subcortical regions (corrected for multiple comparisons). We conducted two analyses with marital status as a predictor of gray matter volume: one without SES and the other controlling for two measures of SES (parental education and household income).

Results: Taken together, this study shows that living in a single-parent household is not independent of SES and supports the importance of SES in normative brain development, likely due to higher SES environments having greater resources (income and education), better nutrition, and easier access to high-quality maternal care during pregnancy.

Discussion: Taken together, this study shows that living in a single-parent household is not independent of SES and supports the importance of SES in normative brain development, likely due to higher SES environments having greater resources (income and education), better nutrition, and easier access to high-quality maternal care during pregnancy.

Keywords (if any): Socioeconomic status, brain structure, single parenthood

Presenter Name: Madison Clark
Classification: Undergraduate
PI: Woynaroski, Tiffany

Relations Between Audiovisual Speech Processing and Language Skills in Infants with Autistic and Non-autistic Siblings

S. Madison Clark, Jennifer E. Markfeld, Grace Pulliam, Pooja Santapuram, Bahar Keceli-Kaysili, Jacob I. Feldman, David J. Lewkowicz, and Tiffany G. Woynaroski

Introduction: A growing body of literature indicates that multisensory processing, or the extent to which individuals can respond to inputs from multiple modalities, may be important for language skills in autistic individuals. However, there is a paucity of literature examining multisensory processing in autistic infants and toddlers. Specifically, no study to date has evaluated (a) whether infants at increased familial- and general population-level likelihood for autism differ in their preference to synchronous audiovisual speech compared to asynchronous audiovisual speech and (b) whether preference to synchronous speech is related to concurrent language abilities.

Methods: Preliminary analyses were conducted on 40 infants (22 with autistic older siblings [Sibs-autism] and 18 with only non-autistic older siblings [Sibs-NA]) aged 6-18 months. Preference for temporal synchrony in audiovisual speech was assessed using a paired-preference task. Two side-by-side videos displayed the same female reciting the same script in English, with one side presenting audiovisual synchrony between the speaker's articulatory movements and speech and the other presenting audio-leading audiovisual asynchrony by 666-ms. The amount of time the infant spent looking at each (a) side of the screen, (b) face, and (c) mouth was recorded using an SMI REDn SensoMotoric Instruments (SMI, Teltow, Germany).

Results: These preliminary results indicate that (a) synchrony detection improves from 6 months to 18 months of age, (b) greater time spent looking at the synchronous face is correlated with greater communication abilities. Additional work is needed to better characterize the link between preference for temporal synchrony and later language outcomes. Future directions for this line of work includes exploring the relations between preference for audiovisual synchrony and later language outcomes, which may differ according to familial likelihood group. Clinical implications will also be discussed.

Discussion: These preliminary results indicate that (a) synchrony detection improves from 6 months to 18 months of age, (b) greater time spent looking at the synchronous face is correlated with greater communication abilities. Additional work is needed to better characterize the link between preference for temporal synchrony and later language outcomes. Future directions for this line of work includes exploring the relations between preference for audiovisual synchrony and later language outcomes, which may differ according to familial likelihood group. Clinical implications will also be discussed.

Keywords (if any): Autism, multisensory, infants

Presenter Name: Kathryn Cooke
Classification: Undergraduate
PI: Niswender, Colleen

Regulation of MeCP2 Overexpression in a Mouse Model of PTHS on the Expression of Suppressors of Cytokine Signaling in Astrocytes

Kathryn G. Cooke, Geanne A. Freitas, Colleen M. Niswender

Introduction: Pitt-Hopkins Syndrome (PTHS) is a genetic disorder caused by mutations in the TCF4 (Transcription Factor 4) gene (Zweier et al., 2007; Brockschmidt et al., 2007; Amiel et al., 2007), which is essential for central nervous system development. A known phenotypic overlap between PTHS and Rett Syndrome (RTT) indicates possible common signaling pathways between the two neurodevelopmental disorders. We have found that increasing expression of Methyl CpG-Binding Protein 2 (MeCP2), the causative protein in most cases of RTT, corrects behavioral impairments in a mouse model of PTHS (Tcf4+/-). Recent findings in our lab have shown that there is an increase in the number of reactive astrocytes in the brain of Tcf4+/- mice overexpressing MeCP2. We hypothesize that this increase is associated with the regulation of signal transducer activator of transcription 3 (STAT3), a key factor in the astrocyte activation pathway, which is known to be regulated by members of the suppressors of cytokine signaling (SOCS) family. Specifically, SOCS1 and SOCS3 are known to be expressed in astrocytes (Maier et al.,2002; Qin et al., 2008), and exert negative feedback onto the STAT3 pathway, modulating astrocyte reactivity (Haim et al., 2015). Additionally, SOCS5 is expressed in astrocytes (Hwang et al., 2007) and is involved in the MeCP2-miR-124-SOCS5 axis, which is indispensable for the cytokine-dependent activation of STAT3 (Jiang et al., 2014). This project aims to investigate how SOCS 1, 3 and 5 are implicated in abnormal astrocyte development in a rescue mouse model of PTHS (MECP2Tg1/o; Tcf4+/-).

Methods: We generated four animal genotypes (WT, MECP2Tg1/o, Tcf4+/-, MECP2Tg1/o; Tcf4+/-) and performed quantitative RT-PCR from the striatum. Our results indicate that there are no significant differences between mRNA expression of Socs1 and Socs5 in striatal tissue of MECP2Tg1/o; Tcf4+/- animals and the respective controls. Additionally, immunohistochemistry studies are underway using specific markers for astrocytes (glial fibrillary acidic protein; GFAP) and SOCS 1, 3 and 5 to analyze the potential expression changes of different SOCS proteins in these cells. We will also be examining the phosphorylation status of STAT3, which represents its active form.

Results: Further results are required to draw conclusive associations of SOCS proteins on functional changes in astrocytes that are mediated by MeCP2 overexpression in Tcf4+/- mice.

Discussion: Further results are required to draw conclusive associations of SOCS proteins on functional changes in astrocytes that are mediated by MeCP2 overexpression in Tcf4+/- mice.

Keywords (if any): Neuroscience, Molecular Pharmacology, Pitt Hopkins Syndrome

References (if any):

Zweier, C., Peippo, M. M., Hoyer, J., Sousa, S., Bottani, A., Clayton-Smith, J., ... & Rauch, A. (2007). Haploinsufficiency of TCF4 causes syndromal mental retardation with intermittent hyperventilation (Pitt-Hopkins syndrome). The American Journal of Human Genetics, 80(5), 994-1001.

Brockschmidt, A., Todt, U., Ryu, S., Hoischen, A., Landwehr, C., Birnbaum, S., ... & Weber, R. G. (2007). Severe mental retardation with breathing abnormalities (Pitt-Hopkins syndrome) is caused by haploinsufficiency of the neuronal bHLH transcription factor TCF4. Human molecular genetics, 16(12), 1488-1494.

Amiel, J., Rio, M., De Pontual, L., Redon, R., Malan, V., Boddaert, N., ... & Colleaux, L. (2007). Mutations in TCF4, encoding a class I basic helix-loop-helix transcription factor, are responsible for Pitt-Hopkins syndrome, a severe epileptic encephalopathy associated with autonomic dysfunction. The American Journal of Human Genetics, 80(5), 988-993.

Maier, J., Kincaid, C., Pagenstecher, A., & Campbell, I. L. (2002). Regulation of signal transducer and activator of transcription and suppressor of cytokine-signaling gene expression in the brain of mice with astrocyte-targeted production of interleukin-12 or experimental autoimmune encephalomyelitis. The American journal of pathology, 160(1), 271-288.

Qin, H., Niyongere, S. A., Lee, S. J., Baker, B. J., & Benveniste, E. N. (2008). Expression and functional significance of SOCS-1 and SOCS-3 in astrocytes. The Journal of Immunology, 181(5), 3167-3176.

Hwang, M. N., Kim, K. S., Choi, Y. W., Jou, I., & Yoon, S. (2007). PMA activates Stat3 in the Jak/Stat pathway and induces SOCS5 in rat brain astrocytes. Molecules & Cells (Springer Science & Business Media BV), 23(1).

Ben Haim, L., Ceyzériat, K., Carrillo-de Sauvage, M. A., Aubry, F., Auregan, G., Guillermier, M., Ruiz, M., Petit, F., Houitte, D., Faivre, E., Vandesquille, M., Aron-Badin, R., Dhenain, M., Déglon, N., Hantraye, P., Brouillet, E., Bonvento, G., & Escartin, C. (2015). The JAK/STAT3 pathway is a common inducer of astrocyte reactivity in Alzheimer's and Huntington's diseases. The Journal of neuroscience : the official journal of the Society for Neuroscience, 35(6), 2817-2829. https://doi.org/10.1523/JNEUROSCI.3516-14.2015

Jiang, S., Li, C., McRae, G., Lykken, E., Sevilla, J., Liu, S. Q., Wan, Y., & Li, Q. J. (2014). MeCP2 reinforces STAT3 signaling and the generation of effector CD4+ T cells by promoting miR-124-mediated suppression of SOCS5. Science signaling, 7(316), ra25. https://doi.org/10.1126/scisignal.2004824

Presenter Name: Kacie Dunham-Carr
Classification: Graduate
PI: Woynaroski, Tiffany

Neural Responses to Audiovisual Speech in Infants at Increased Likelihood for Autism: An ERP Pilot Study

Kacie Dunham-Carr, Bahar Keceli-Kaysili, Alexandra J. Golden, Pooja Santapuram, Jennifer Markfeld, Jacob I. Feldman, Tiffany G. Woynaroski

Introduction: Explaining individual differences in early language ability in autistic children is critical because early language is linked with long-term outcomes in this population. Audiovisual speech processing efficiency as measured by event-related potentials (ERPs) may explain variability in language development; audiovisual speech processing efficiency has been indexed by P2 amplitude suppression in response to audiovisual versus auditory-only speech in school-aged autistic and non-autistic children, and P2 amplitude suppression is associated with vocabulary. This study evaluates the role of audiovisual speech processing in development by determining: (a) if visual cues increase speech processing efficiency as indexed by ERPs in infants at general population-level likelihood for autism (infant siblings of non-autistic children; Sibs-NA), (b) if infants at increased familial likelihood for autism (infant siblings of autistic children; Sibs-AUT) display reduced speech processing efficiency with access to multisensory versus unisensory cues compared to Sibs-NA, and (c) if individual differences in audiovisual speech processing efficiency covary with language ability.

Methods: Sixty 12-18 month old infants (30 Sibs-AUT; 30 Sibs-NA matched on sex and chronological age) are being recruited. Participants view videos of a female speaking syllables in audiovisual (auditory speech + synchronous visual mouth movements) and auditory only (auditory speech + still image of the face) conditions. Electroencephalography is collected using NetStation and a 128-channel Geodesic sensor net (Net Amps 400 amplifier, Hydrocel GSN 128 EEG cap, EGI Systems Inc.). The raw EEG signal is sampled at 1000 Hz and referenced to vertex (Cz). The amplitude of the P2 component (defined a priori as occurring between 250 ms and 410 ms) as measured at Cz is extracted from the average ERP of each participant. Participants' language ability is measured via the MacArthur-Bates Communicative Development Inventory, the receptive and expressive subscales of the Vineland Adaptive Behavior Scales, and the receptive and expressive language subscales of the Mullen Scales of Early Learning. Scores from these measures are aggregated following z-score transformation to derive receptive and expressive language aggregates.

Results: These findings not only replicate prior results in school-aged children, but also suggest that differential processing of audiovisual speech may emerge early in life and be clinically useful for explaining individual differences in language ability in autistic and non-autistic children.

Discussion: These findings not only replicate prior results in school-aged children, but also suggest that differential processing of audiovisual speech may emerge early in life and be clinically useful for explaining individual differences in language ability in autistic and non-autistic children.

Keywords (if any): autism, audiovisual speech, ERP

References (if any):

Dunham-Carr, K., Feldman, J. I., Simon, D. M., Edmunds, S. R., Tu, A., Kuang, W., Conrad, J. G., Sanapuram, P., Wallace, M. T., & Woynaroski, T. G. (2023). The processing of audiovisual speech is linked with vocabulary in autistic and nonautistic children: An ERP study. Brain Sciences, 13(7), Article 1043. https://doi.org/10.3390/brainsci13071043

Knowland, V. C. P., Mercure, E., Karmiloff-Smith, A., Dick, F., & Thomas, M. S. C. (2014). Audio-visual speech perception: A developmental ERP investigation. Developmental Science, 17, 110-124. https://doi.org/10.1111/desc.12098

van Wassenhove, V., Grant, K. W., & Poeppel, D. (2005). Visual speech speeds up the neural processing of auditory speech. Proceedings of the National Academy of Sciences of the United States of America, 102, 1181-1186. https://doi.org/10.1073/pnas.0408949102

Presenter Name: Aiden Delahanty
Classification: Graduate
PI: Kang, Jing-Qiong

Evaluation of 4-phenylbutyrate rescue on epilepsy associated with traumatic brain injury

Aiden Delahanty, Wangzhen Shen, Li Ding, Karishma Randhave, Martin Gallagher, Jing-Qiong Kang

Introduction: Traumatic brain injury (TBI) is very common, which affects 1.6-3.8 million civilians and ~20,000 military personnel in America. Mild traumatic brain injury may affect brain cells temporarily. More-serious traumatic brain injury can result in bruising, torn tissues, bleeding and other permanent damage to the brain. These injuries can result in long-term complications such as epilepsy. In fact, TBI is a leading cause of epilepsy. The sudden insult on the brain unleashes cascades of events, prominently including neuroinflammation and massive oxidative stress that evolve over time, further complicating the brain injury process, but also clearing cellular debris and establishing homeostasis in the region of damage. Accumulating evidence suggests that endoplasmic reticulum stress, oxidative stress and neuroinflammatory response as well as altered GABAA receptor expression and function contribute to posttraumatic epileptogenes and seizure activities. The goal of this project is to determine if 4 phenylbutyrate (PBA), an endoplasmic reticulum stress reducer PBA can reduce ER stress, reduce neuroinflammation and restore GABAA receptor function in TBI mouse model.

Methods: We blasted DBA 2J mice at 2-3 months old with closed head injury with a single or double blast. The mice received a single blast was taken as mild brain injury while the mice receive a double blast was taken as severe brain injury. The mice were divided as sham and treated with PBA (100mg/kg, ip, single injection for 7days). We either isolated the microsome from the mice or dissected the desired brain regions to evaluate the total protein expression. We evaluate the neuroinflammatory marker such as TNF, IL-1, IL6 and NF-kB, ER stress marker such as GADD153, GRP78 and ER proteins such as Hsp47. We also evaluated GABAA receptor expression in the mice of each treatment group.

Results: The study may provide valuable information regarding the TBI especially severe TBI and ER stress and neuroinflammation. The findings will provide guide for application of PBA in TBI associated epilepsy.

Discussion: The study may provide valuable information regarding the TBI especially severe TBI and ER stress and neuroinflammation. The findings will provide guide for application of PBA in TBI associated epilepsy.

Keywords (if any): Brain injury, Epilepsy

Presenter Name: Leighton Durham
Classification: Graduate
PI: Kaczkurkin, Antonia

A Hierarchical Model of Internalizing Problems in Youth and Associated Brain Volume Differences

E. Leighton Durham, Hee Jung Jeong, Gabrielle E. Reimann, Camille Archer, Tyler M. Moore, and Antonia N. Kaczkurkin

Introduction: Internalizing psychopathology, which encompasses an array of mental health conditions including depression and anxiety, often has its onset in youth and is characterized by substantial comorbidity and heterogeneous clinical presentations. Further, internalizing psychopathologies have been found to have both shared and distinct neural mechanisms. However, the traditional classification approach of categorizing internalizing symptoms into distinct diagnostic categories involves relying on relatively arbitrary cutoffs and fails to adequately capture the full spectrum and complexity of internalizing psychopathology. Thus, data-driven hierarchical modeling of internalizing symptoms serves as an alternative approach to conceptualizing the structure of internalizing psychopathology that better captures its continuous and dimensional nature. Relating such models to neural measures in youth can advance our understanding of both specific and overlapping neurobiological mechanisms underlying different dimensions of internalizing symptoms during brain development.

Methods: The current project utilized a large sample (N = 11,876) of children aged 9 to 10 years old from the Adolescent Brain Cognitive Development (ABCD) Study. Internalizing symptoms were assessed with parent report on the Child Behavior Checklist and Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children. Brain volume was measured with 3T magnetic resonance imaging. Exploratory structural equation modeling followed by confirmatory bifactor modeling was used to identify a general factor of internalizing psychopathology, as well as specific subfactors. Structural equation modeling was implemented to examine associations between each of these factors and total intracranial volume (TICV). Age, sex, race/ethnicity, and MRI manufacturer were included as covariates.

Results: This study is among the first to uncover the data-driven hierarchical structure underlying internalizing problems in a large sample of children. In addition to replicating the dissociation between fear and distress symptoms found in adult studies, this model also reveals novel factors representing cognitive and somatic problems which may be important for the presentation of anxiety and depression in children. This study further reveals neurostructural differences associated with general internalizing problems, as well as with fear symptoms and cognitive difficulties more specifically.

Discussion: This study is among the first to uncover the data-driven hierarchical structure underlying internalizing problems in a large sample of children. In addition to replicating the dissociation between fear and distress symptoms found in adult studies, this model also reveals novel factors representing cognitive and somatic problems which may be important for the presentation of anxiety and depression in children. This study further reveals neurostructural differences associated with general internalizing problems, as well as with fear symptoms and cognitive difficulties more specifically.

Keywords (if any): Internalizing, Neurostructure, Development

Presenter Name: Eman Durrani
Classification: Research staff
PI: Taylor, Julie Lounds

Job Characteristics of Autistic Adults: Associations with Satisfaction

Eman Durrani, Sophia Brandl-Mueller, Natalie Libster, Ph.D., Leann DaWalt, Ph.D., Julie Lounds Taylor, Ph.D.

Introduction: Improving employment outcomes is an important aspect of independent living and quality of life for autistic adults (Harmuth et al., 2018; Taylor et al., 2015). Attention has shifted beyond measuring whether these adults have a job to considering factors that contribute to their satisfaction in the workforce (Hedley et al. 2017; Pfeiffer et al. 2018; Martin et al, 2022). The purpose of this study is to examine which job characteristics are associated with job satisfaction for autistic adults.

Methods: This analysis used baseline data from a longitudinal study on employment stability among autistic adults. Autistic working adults (N=88; 56 male) between the ages of 18-35 (M=25.79) completed the Vocational Index (Taylor & Seltzer, 2012), which provides detailed information about vocational and educational activities and whether supports were received at the job. Work activities were coded into one of five job categories outlined by the U.S. Bureau of Labor Statistics. Jobs were further coded based on the level of education needed for a job using criteria from the Occupational Network - if participants' education level was higher than the education needed for their job, they were coded as "overeducated." Job Satisfaction was measured using the Job Descriptive Index (JDI; Smith et al., 1969) a 38-item questionnaire measuring job satisfaction across five subscales: supervision, coworkers, pay, promotions, and the work itself. Descriptive statistics and independent-samples t-tests were conducted.

Results: The current findings suggest that satisfaction among working autistic adults may not depend on employment in one specific type of job - rather, facilitating access to jobs that are consistent with a person's education may lead to more fulfilling work. Our results further highlight the importance of formal and informal job supports that contribute to autistic adults' satisfaction with their work.

Discussion: The current findings suggest that satisfaction among working autistic adults may not depend on employment in one specific type of job - rather, facilitating access to jobs that are consistent with a person's education may lead to more fulfilling work. Our results further highlight the importance of formal and informal job supports that contribute to autistic adults' satisfaction with their work.

Keywords (if any): Autism, Employment, Job Satisfaction

References (if any):

Harmuth, E., Silletta, E., Bailey, A., Adams, T., Beck, C., & Barbic, S. P. (2018). Barriers and facilitators to employment for adults with autism: A scoping review. Annals of International Occupational Therapy, 1(1), 31-40. https://doi.org/10.3928/24761222-20180212-01

Hedley D., Uljarević, M., Cameron, L., Halder, S., Richdale, A., & Dissanayake, C. (2017). Employment programmes and interventions targeting adults with autism spectrum disorder: A systematic review of the literature. Autism., 21(8), 929-941. https://doi.org/10.1177/1362361316661855

Pfeiffer, B., Brusilovskiy, E., Davidson, A., & Persch, A. (2018). Impact of person-environment fit on job satisfaction for working adults with autism spectrum disorders. Journal of Vocational Rehabilitation, 48(1), 49-57. https://doi.org/10.3233/JVR-170915

Smith, P. C., Kendall, L., & Hulin, C. L. (1969). The measurement of satisfaction in work and retirement: A strategy for the study of attitudes. Chicago: Rand McNally.

Taylor, J. L., Henninger, N. A., & Mailick, M. R. (2015). Longitudinal patterns of employment and postsecondary education for adults with autism and average-range IQ. Autism, 19(7), 785-793. https://doi.org/10.1177/1362361315585643

Taylor, J. L., & Seltzer, M. M. (2012). Developing a vocational index for adults with autism spectrum disorders. Journal of Autism and Developmental Disorders, 42(12), 2669-2679. DOI: 10.1007/s10803-012-1524-

Martin, V., Flanagan, T. D., Vogus, T. J., & Chênevert, D. (2022). Sustainable employment depends on quality relationships between supervisors and their employees on the autism spectrum. Disability and rehabilitation, 1-12. Advance online publication. https://doi.org/10.1080/09638288.2022.2074550

Presenter Name: Sophie Edelman
Classification: Undergraduate
PI: Biggs, Elizabeth

Peer Engagement and Relationships Among Minimally Verbal Students with Autism and their Neurotypical Peers: A Mixed Methods Study

Sophie M. Edelman

Introduction: Peer relationships are important for all children (Bukowski et al., 1996). However, high-quality friendships remain relatively elusive for children with intellectual and developmental disabilities, such as autism, particularly when students are minimally verbal. Approximately 30-40% of elementary-aged students with autism are nonspeaking or have limited speech for communication (Koegel et al., 2020). When taking into account the observed high rates of stigmatization and exclusion from neurotypical peers students with autism often face, the need for effective interventions and support becomes readily apparent (Sreckovic et al., 2014). This poster will present a mixed methods study focused on engagement and relationships among elementary-aged, minimally verbal students with autism and their peers.

Methods: The study utilized a concurrent parallel mixed method design (Creswell & Plano-Clark, 2018). Participants included four students with autism and complex communication needs and eight of their neurotypical peers (2 per focus student). Data were drawn from a larger intervention study which evaluated whether peers could learn to use "Ways to Talk and Play" (i.e., engagement and interaction strategies) within a network intervention (Biggs & Robison, 2020). The study for this poster is focused on providing an in-depth understanding of peer engagement and relationships during the intervention. We focus on peer relationships as a multifaceted concept involving observable behaviors and non-observable attitudes. Quantitative data involved observational coding of play sessions before and after the peers learned the "Ways to Talk and Play," focusing on student-peer joint engagement (Tomasello & Farrar, 1986). Qualitative data involved thematic analysis of peer interviews conducted before, during, and after the intervention to illuminate peer perceptions of friendship, their relationship with the focus student, and of disability more broadly. We also conducted adapted interviews with the students with autism.

Results: Interventions like peer networks are being designed and tested to try to support greater interactions and relationships among students with disabilities and their peers. However, little is known about what peer relationships are really like for minimally verbal students with autism, including observable and non-observable aspects. This study will provide critical information about the actual nature of peer engagement and relationships, which can assist in creating greater opportunities for friendship and more inclusive school communities.

Discussion: Interventions like peer networks are being designed and tested to try to support greater interactions and relationships among students with disabilities and their peers. However, little is known about what peer relationships are really like for minimally verbal students with autism, including observable and non-observable aspects. This study will provide critical information about the actual nature of peer engagement and relationships, which can assist in creating greater opportunities for friendship and more inclusive school communities.

Keywords (if any): Autism, Friendship, Communication

References (if any):

Biggs, E., & Robinson, S. (2020). Review of the evidence base for peer network interventions for students with IDD. Remedial and Special Education, 1-17. https://doi.org/10.1177/07419325221075013
Bukowski, W. M., Newcomb, A., & Hartup, W. (1996). The company they keep: Friendships in childhood and adolescence. New York, NY: Cambridge University Press.
Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed). Sage. Guetterman, T. C., & Fetters, M. D. (2022). Data visualization in the context of integrated analyses. In J. H. Hitchcock & A. J. Onwuegbuzie (Eds.) Routledge handbook for advancing integration in mixed methods research (pp. 301-323). Routledge.
Koegel, L. K., Bryan, K. M., Su, P. L., Vaidya, M., & Camarata, S. (2020). Definitions of nonverbal and minimally verbal in research for autism: A systematic review of the literature. Journal of Autism and Developmental Disorders, 50, 2957-2972. https://doi.org/10.1007/s10803-020-04402-w
Sreckovic, M. A., Brunsting, N. C., & Able, H. (2014). Victimization of students with autism spectrum disorder: A review of prevalence and risk factors. Research in Autism Spectrum Disorders, 8(9), 1155-1172. https://doi.org/10.1016/j.rasd.2014.06.004
Tomasello, M., & Farrar, M. J. (1986). Joint attention and early language. Child Development, 57(6), 1454-1463. https://doi.org/10.2307/1130423

Presenter Name: Jacob Feldman
Classification: Postdoc
PI: Woynaroski, Tiffany

REPRESENT AIM: A Systematic Review and Meta-Analysis of the Sample Demographics in Autism Intervention Research

Jacob I Feldman, Jennifer E Markfeld, Ryan A Millager, Shannon Crowley LaPoint, Habib Kouria, Zachary J Williams, Micheal Sandbank, Kristen Bottema-Beutel, Tiffany G Woynaroski

Introduction: Systematic reviews and meta-analyses on the large corpus of autism early childhood intervention research may not generalize to the full population of autistic individuals if samples are not representative. This study systematically reviewed and synthesized participant characteristics (i.e., race, ethnicity, sex) in this literature base.

Methods: All studies in the Autism Intervention Meta-Analysis for Studies of Young Children (Project AIM; a systematic review autism early childhood intervention research) were double coded for the available frequency count of race using NIH categories (i.e., American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White, Other, Multiracial); ethnicity (i.e., Hispanic or Latino, Non Hispanic or Latino); and parent-reported sex. In a series of planned analyses: (a) the median proportion of each category was calculated for each eligible study; (b) 95% highest-density credible intervals (CrIs) were generated, and (c) CrIs were compared to 2020 data for (a) the general population (i.e., US Census), and (b) the autistic population (i.e., Autism and Developmental Disabilities Monitoring Network; ADDM).

Results: Patterns of reporting participant demographic information across primary studies testing effects of autism interventions are poor. Results suggest that females/girls and all racial minority groups are underrepresented compared to recent US Census and ADDM data. This result, sadly, accords with findings for representation across broader biomedical and social sciences research. These findings have important implications for the external validity of early childhood autism intervention research. Researchers must be more diligent about reporting demographic constructs and more purposeful in recruiting participants from diverse backgrounds.

Discussion: Patterns of reporting participant demographic information across primary studies testing effects of autism interventions are poor. Results suggest that females/girls and all racial minority groups are underrepresented compared to recent US Census and ADDM data. This result, sadly, accords with findings for representation across broader biomedical and social sciences research. These findings have important implications for the external validity of early childhood autism intervention research. Researchers must be more diligent about reporting demographic constructs and more purposeful in recruiting participants from diverse backgrounds.

Keywords (if any): Autism, Health equity, Meta-science

Presenter Name: Aysu Erdemir
Classification: Research staff
PI: Jones, Robin

The Impact of Emotional Processes on Cognitive Control in Young Children who Stutter

Aysu Erdemir, Hatun Zengin-Bolatkale, Alexandra Key, Robin Jones

Introduction: Emerging research indicates that young children who stutter (CWS) display increased emotional reactivity in emotionally arousing conditions (Erdemir et al., 2018; Jones et al., 2014, 2017; Zengin-Bolatkale et al., 2018). We have also previously speculated (Jones et al., 2017) that emotional processes may impact ongoing cognitive control processes, such as inhibition, which have been shown to differ between CWS and CWNS (Anderson & Wagovich, 2017; Eggers et al., 2013). Despite these advances, we are lacking an understanding of how emotion contributes to stuttering. In the current study, we explore how emotional processes influence cognitive control in CWS by performing a child-friendly Go/No-go task with emotion induction while event related potentials (ERPs) and behavioral performances were recorded.

Methods: Participants were preschool-age children aged 37 to 80 months. Participants wore an EEG cap with 128 Ag/AgCl electrodes embedded in soft sponges (Geodesic Sensor Net, EGI, Inc.) while playing a child-friendly Go/No-go task known as the "Zoo Game." This task, inspired by Grammer et al. (2014), involved helping a zookeeper capture escaped animals by pressing a button (Go) when animal pictures appeared on a computer screen. However, two orangutans were "helpers," and participants had to inhibit their response (NoGo) when seeing their pictures. The game had a 75% Go and 25% NoGo trial ratio, creating a strong impulse to respond. The game comprised two blocks: one with neutral pictures and another with emotionally arousing pictures.

Results: Results of this study will advance our understanding of cortical associates of inhibitory control, its relation to emotion and to the onset and development of childhood stuttering.

Discussion: Results of this study will advance our understanding of cortical associates of inhibitory control, its relation to emotion and to the onset and development of childhood stuttering.

Keywords (if any): developmental stuttering, emotion, inhibition

References (if any):

Anderson, J. D., & Wagovich, S. A. (2017). Explicit and Implicit Verbal Response Inhibition in Preschool-Age Children Who Stutter. Journal of Speech, Language, and Hearing Research, 60(4), 836-852.
Eggers, K., De Nil, L. F., & Van den Bergh, B. R. H. (2013). Inhibitory control in childhood stuttering. Journal of Fluency Disorders, 38(1), 1-13.
Erdemir, A., Walden, T. A., Jefferson, C. M., Choi, D., & Jones, R. M. (2018). The effect of emotion on articulation rate in persistence and recovery of childhood stuttering. Journal of Fluency Disorders, 56, 1-17.
Jones, R. M., Conture, E. G., & Walden, T. A. (2014). Emotional reactivity and regulation associated with fluent and stuttered utterances of preschool-age children who stutter. Journal of Communication Disorders, 48, 38-51.
Jones, R. M., Walden, T. A., Conture, E. G., Erdemir, A., Lambert, W. E., & Porges, S. W. (2017). Executive Functions Impact the Relation Between Respiratory Sinus Arrhythmia and Frequency of Stuttering in Young Children Who Do and Do Not Stutter. Journal of Speech, Language, and Hearing Research, 60(8), 2133-2150.
Randall, W. M., & Smith, J. L. (2011). Conflict and inhibition in the cued-Go/NoGo task. Clinical Neurophysiology, 122(12), 2400-2407.
Twomey, D. M., Murphy, P. R., Kelly, S. P., & O'Connell, R. G. (2015). The classic P300 encodes a build-to-threshold decision variable. European Journal of Neuroscience, 42(1), 1636-1643.
Zengin-Bolatkale, H., Conture, E. G., Key, A. P., Walden, T. A., & Jones, R. M. (2018). Cortical associates of emotional reactivity and regulation in childhood stuttering. Journal of Fluency Disorders, 56, 81-99.

Presenter Name: Kasey Fitzpatrick
Classification: Research staff
PI: Malow, Beth

Needed Resources Highlighted by Clinicians within the ECHO Model

Kasey Fitzpatrick, Sally Furukawa, Beth Malow

Introduction: The Extension for Community Healthcare Outcomes (ECHO) model has served to create knowledge-sharing among participants in an all-teach, all-learn environment. This ECHO project is tailored for clinicians who are caring for individuals with intellectual or developmental disabilities. While some resources are available, access to these resources can be challenging. The goal of this project is to share knowledge and build communities that would facilitate a lifeline of communication among providers.

Methods: The ECHO project focuses on creating a learning community. The structure includes participant introductions that facilitate community building, where everyone is on a first-name basis. A case presentation follows introductions, and includes clarifying questions, real-time feedback, and recommendations. The ECHO session is rounded out by an expert speaking on a particular topic related to the general goal of the ECHO. We have also added pre-project and post-project surveys that were collected in REDCap.

Results: While resources were already created to serve multiple needs, dissemination work is still needed. Despite the accessibility of tools and resources published online, projects like this one are needed to familiarize clinicians working with underserved populations. They become aware of available resources in their communities and online.

Discussion: While resources were already created to serve multiple needs, dissemination work is still needed. Despite the accessibility of tools and resources published online, projects like this one are needed to familiarize clinicians working with underserved populations. They become aware of available resources in their communities and online.

Keywords (if any): Community resources, ECHO project

Presenter Name: Noah Fram
Classification: Postdoc
PI: Lense, Miriam

Social interaction links active musical rhythm engagement and expressive communication in autistic toddlers

Noah R. Fram, Talia Liu, Miriam D. Lense

Introduction: Rhythm is implicated in both social and linguistic development. Rhythm perception and production skills are also key vulnerabilities in neurodevelopmental disorders such as autism which impact social communication (Lense et al., 2021). However, direct links between musical rhythm engagement and expressive communication are not clear. This absence of a direct connection between rhythm and expressive communication indicates that the mechanism of action between rhythm and expressive communication may recruit other cognitive or developmental factors. We hypothesized social interactions, including general interpersonal relationships and interactive music-making involving children and caregivers, were a significant such factor, particularly in autism.

Methods: We collected data from parents of autistic (n=74) and nonautistic (n=49) children 14-36 months of age, including parent reports of their children's rhythmic musical engagement, general social skills, parent-child musical interactions, and expressive communication skills. We examined correlations between the home musical environment and social and communicative development in both autistic and nonautistic children. Then, we employed a path model to test the pivotal role of autistic children's musical/rhythmic engagement capacities for supporting their social interactions and communication skills.

Results: This system of independent pathways implies both that social and musical interactions represent crucial links between rhythm and language and that different kinds of social interactions play parallel, independent roles linking rhythmic musical engagement with expressive communication skills. Our findings here linking children's musical capacities with both musical interactions and broader interpersonal skills, which in turn connect with communication skills, emphasize music's social and interactive nature that manifests in a variety of contexts and across neurodiverse populations (Kasdan et al., 2021).

Discussion: This system of independent pathways implies both that social and musical interactions represent crucial links between rhythm and language and that different kinds of social interactions play parallel, independent roles linking rhythmic musical engagement with expressive communication skills. Our findings here linking children's musical capacities with both musical interactions and broader interpersonal skills, which in turn connect with communication skills, emphasize music's social and interactive nature that manifests in a variety of contexts and across neurodiverse populations (Kasdan et al., 2021).

Keywords (if any): Autism, Social communication, Parent-child musical interaction

References (if any):

Kasdan, A., Gordon, R. L., & Lense, M. D. (2021). A neurodevelopmental disorders perspective into music, social attention, and social bonding. Behavioral and Brain Sciences, 44. Scopus. https://doi.org/10.1017/S0140525X20001302.

Lense, M. D., Ladányi, E., Rabinowitch, T.-C., Trainor, L., & Gordon, R. (2021). Rhythm and timing as vulnerabilities in neurodevelopmental disorders. Philosophical Transactions of the Royal Society B: Biological Sciences, 376(1835). https://doi.org/10.1098/rstb.2020.0327.

Steinberg, S., Shivers, C. M., Liu, T., Cirelli, L. K., & Lense, M. D. (2021). Survey of the home music environment of children with various developmental profiles. Journal of Applied Developmental Psychology, 75, 101296. https://doi.org/10.1016/j.appdev.2021.101296.

Presenter Name: Geanne Freitas
Classification: Postdoc
PI: Niswender, Colleen

MeCP2 upregulation effects on JAK-STAT3 pathway in astrocytes in a Pitt-Hopkins Syndrome Mouse Model

Geanne A. Freitas, Kathryn G. Cooke, Sheryl Anne D. Vermudez, Rocco G. Gogliotti, Colleen M. Niswender

Introduction: Pitt-Hopkins syndrome (PTHS) is a neurodevelopmental disorder caused by monoallelic mutations or deletions in the Transcription Factor 4 (TCF4) gene. Due to the established role for TCF4 in regulating the maturation of oligodendrocyte progenitors and a subpopulation of astrocytes, Kim et al. (2022) attempted to normalize Tcf4 specifically expression in oligodendrocytes; however, aberrant behavioral phenotypes were not reversed. A known phenotypic overlap between PTHS and Rett syndrome (RTT) indicates that there are possible common signaling pathways between the two neurodevelopmental disorders. We have found that increasing expression of Methyl CpG Binding Protein 2 (MeCP2), the causative protein in most cases of RTT, can reverse defective phenotypes found in a mouse model of PTHS (Tcf4+/-). Recent findings in our lab using Tcf4+/- mice have also indicated that astrocyte morphology and number is changed after MeCP2 upregulation. Previous studies had shown that MeCP2 can regulate the Janus Kinase - Signal Transducer and Activator of Transcription 3 (JAK-STAT3) pathway in astrocytes, by inhibiting the STAT3 phosphorylation (Jiang et al., 2014). The current study sought to understand if the effects of MeCP2 overexpression on behavioral phenotypes in the Tcf4+/- model were due to a change in the functioning of astrocytes.

Methods: We generated four animal genotypes (WT, MECP2Tg1/o, Tcf4+/-, MECP2Tg1/o; Tcf4+/-) and performed quantitative RT-PCR from the cortex, hippocampus and striatum followed by western blot and immunohistochemistry studies using specific markers for astrocytes and STAT3 (Glial Fibrillary Acidic Protein; anti-GFAP, phosphorylated- and non-phosphorylated-Signal Transducer and Activator of Transcription 3; anti-pSTAT3 and anti-STAT3) to analyze the morphology and reactivity state of these cells in our experimental groups.

Results: Further studies are required to determine if behavioral phenotypic rescue in MECP2Tg1/o; Tcf4+/- mice is due differential astrocyte signaling during development mediated by MeCP2 overexpression.

Discussion: Further studies are required to determine if behavioral phenotypic rescue in MECP2Tg1/o; Tcf4+/- mice is due differential astrocyte signaling during development mediated by MeCP2 overexpression.

Keywords (if any): MeCP2, Astrocytes, JAK-STAT3

References (if any):

Kim H, Gao EB, Draper A, Berens NC, Vihma H, Zhang X, Higashi-Howard A, Ritola KD, Simon JM, Kennedy AJ, Philpot BD (2022). Rescue of behavioral and electrophysiological phenotypes in a Pitt-Hopkins syndrome mouse model by genetic restoration of Tcf4 expression. Elife.

Jiang, S., Li, C., McRae, G., Lykken, E., Sevilla, J., Liu, S. Q., Wan, Y., & Li, Q. J. (2014). MeCP2 reinforces STAT3 signaling and the generation of effector CD4+ T cells by promoting miR-124-mediated suppression of SOCS5. Science signaling, 7(316), ra25.

Funding: The Pitt Hopkins Research Foundation and the International Rett Syndrome Foundation

Presenter Name: Sally Furukawa
Classification: Research staff
PI: Malow, Beth

The Woes of Incomplete Surveys: Results from Multiple Projects

Sally Furukawa, Kasey Fitzpatrick, Beth Malow

Introduction: Completing a study depends on multiple factors. In our work, we seek to create efficient and effective ways for coordinators and participants to complete the tasks required while complimenting existing clinical workflow.

Methods: In our project, we are creating ways to eliminate major factors that can lead to disinterest or even burnout in a study. Specifically, we are seeking to: Decrease excessive burden for participants to complete the study, Create access to resources that are tailored to the needs of participants, and Eliminate redundancies and ensure efficiency for coordinators and clinicians We are using REDCap to create automated processes for efficiency to identify resources for participants. We have also capitalized on clinical routines to create projects that have become essential to the clinic.

Results: Study burnout and survey fatigue are challenges in any study. However, we have made progress in creating efficient ways to avoid redundancies and create meaningful access to existing resources. We are creating research projects that are meaningful for all stakeholders (participants, clinicians, and coordinators).

Discussion: Study burnout and survey fatigue are challenges in any study. However, we have made progress in creating efficient ways to avoid redundancies and create meaningful access to existing resources. We are creating research projects that are meaningful for all stakeholders (participants, clinicians, and coordinators).

Keywords (if any): Efficiency, Streamline, REDCap

Presenter Name: Yunlai Gui
Classification: Research staff
PI: Park, Sohee

The Intergenerational Transmission of Social Essentialism: How Parents' Beliefs Influence Children's Beliefs And Social Functioning

Yunlai Gui, Yian Xu, Marjorie Rhodes

Introduction: Why do most of us believe that boys love cars and girls love dolls? One explanation children might provide is that different social groups (e.g. boys vs. girls) are fundamentally distinct from one another by nature. This line of thought reflects social essentialist thinking, which could have many negative impacts on children and society. Indeed, research shows that children's social essentialism can negatively influence inter-group relations, for example, by promoting unwillingness to share resources with out-group members. Social essentialism can lead to stereotyping, prejudice, and even impairments in social functioning. Previous research has tried to understand how this belief develops in children through language transmission from parents. In the present study, we further examine the role of parents in shaping these processes by exploring the direct relationship between parents' own social essentialist beliefs and children's essentialist beliefs in a natural setting.

Methods: We recruited 280 American families through our online data collection platform, Panda. Children (3-5 years old) completed five social essentialism tasks online, each showing different social situations and probing different components of children's social essentialist beliefs. Parents then completed a questionnaire online about their own social essentialist beliefs.

Results: Our findings suggest that parents' essentialist beliefs have an influence on how children understand the social world and how they interact with social members, which could further impact their overall social functioning. Specifically, parents' beliefs about the homogeneity of group members in the familiar social category (e.g. girls are all alike) strongly predict their children's beliefs. Future research should try to identify specific social situations where parents' beliefs have a more significant influence on children and try to mitigate the negative impacts on children's social functioning.

Discussion: Our findings suggest that parents' essentialist beliefs have an influence on how children understand the social world and how they interact with social members, which could further impact their overall social functioning. Specifically, parents' beliefs about the homogeneity of group members in the familiar social category (e.g. girls are all alike) strongly predict their children's beliefs. Future research should try to identify specific social situations where parents' beliefs have a more significant influence on children and try to mitigate the negative impacts on children's social functioning.

Keywords (if any): intergenerational transmission, conceptual development, childhood

References (if any):

Diesendruck, G. (2020, June 1). Why do children essentialize social groups? Advances in Child Development and Behavior. Retrieved September 23, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S0065240720300306?via%3Dihub;

Rhodes, M., & Moty, K. (2020, June 1). What is social essentialism and how does it develop? Advances in Child Development and Behavior. Retrieved September 23, 2022, from https://www.sciencedirect.com/science/article/pii/S006524072030029X?via%3Dihub;

Rhodes M., Leslie SJ., Saunders K., Dunham Y., & Cimpian A. (2018). How does social essentialism affect the development of inter-group relations? Developmental science. Retrieved September 23, 2022, from https://pubmed.ncbi.nlm.nih.gov/28229563/

Presenter Name: Aashi Gurijala
Classification: Undergraduate
PI: Broadie, Kendal

Linking Fragile X Syndrome (FXS) and Glycogen Storage Disease Type IX (GSD)

Aashi Gurijala, Emma Rushton, Kendal Broadie

Introduction: A patient with mutations in Fragile X Mental Retardation Protein (FMRP) and Phosphorylase Kinase Regulatory Subunit Alpha 2 (PHKA2) has symptoms far more severe than either disease alone. We hypothesize an interaction based on unsustainably elevated metabolic demand. We tested this hypothesis in established FXS and new GSD Drosophila disease models. FXS animals have elevated glycogen anabolism pathways with increased insulin-like peptide (DILP2). An alternative pathway to carbohydrate breakdown is suggested in GSD and FXS animals.

Methods: Fat quantification assays show significantly lowered amounts in FXS animals, while FXS/GSD double mutant animals possess significantly greater amounts of fat. Fat levels are controlled by Fat Body Protein (FBP-1) downstream of steroid hormone regulation. FXS animals have elevated FBP-1 levels, while FXS/GSD double mutant animals are similar to controls. Adult control animals are characterized by an almost complete absence of FBP-1, while FXS animals continue to show high FBP-1 levels, suggesting fat breakdown is aberrantly meeting metabolic demands. Lack of fat breakdown in FXS/GSD double mutant animals may lead to metabolic phenotypes due to an energy deficit.

Results: A potential mechanism is the elevated Glycogen Synthase Kinase-3 (GSK3) levels characterizing the FXS disease state. Consistently, GSK3 knockdown reduces PHKA2 RNA levels, while GSK3 overexpression elevates PHKA2. These results suggest the FXS disease state with heightened GSK3 levels typically requires elevated PHKA2 to breakdown glycogen, which is why stronger phenotypes occur when paired with a GSD disease state caused by lowered PHKA2 levels. In future experiments, we will test PHKA2 enzymatic activity using phosphorylase assays, and ATP levels to compare linked energy deficits in both single and double mutant genotypes of the FXS and GSD disease states.

Discussion: A potential mechanism is the elevated Glycogen Synthase Kinase-3 (GSK3) levels characterizing the FXS disease state. Consistently, GSK3 knockdown reduces PHKA2 RNA levels, while GSK3 overexpression elevates PHKA2. These results suggest the FXS disease state with heightened GSK3 levels typically requires elevated PHKA2 to breakdown glycogen, which is why stronger phenotypes occur when paired with a GSD disease state caused by lowered PHKA2 levels. In future experiments, we will test PHKA2 enzymatic activity using phosphorylase assays, and ATP levels to compare linked energy deficits in both single and double mutant genotypes of the FXS and GSD disease states.

Keywords (if any): Drosophila, Metabolism, Fragile X Syndrome

Presenter Name: Emily Harriott
Classification: Graduate
PI: Cutting, Laurie

White matter integrity distinctly relates to single word recognition skills and reading comprehension skills in childhood

Emily M. Harriott, Tin Q. Nguyen, Bennett A. Landman, Laura A. Barquero, Laurie E. Cutting

Introduction: Given the number of children who struggle to read, understanding structural and functional neurobiological correlates of reading is of interest. Diffusion weighted imaging (DWI) has been used to investigate white matter (WM) tracts underlying single word recognition; however, fewer studies have examined WM in relation to reading comprehension.

Methods: In a sample of 344 children (M=9.34 years; SD=2.08 years) we investigated the relationship between fractional anisotropy (FA), a DWI metric quantifying the direction of water molecule movement along WM tracts (thought to reflect tract integrity) and reading. We used TRACULA to identify WM tracts (superior longitudinal fasciculi, arcuate fasciculi, inferior longitudinal fasciculi, and uncinate fasciculi) and calculate FA values. Regression analyses with each tract's FA value were run to predict (1) word recognition, (2) reading comprehension, and (3) reading comprehension controlling for word recognition.

Results: As expected, word recognition and reading comprehension were both positively related to indices of integrity of WM in tracts consistently linked to reading skills. However, our findings suggest that when controlling for word recognition skills, reading comprehension is linked to FA of the arcuate fasciculus bilaterally. These results suggest that the association between WM integrity and reading is distinct for word-level versus higher-level processes in reading comprehension.

Discussion: As expected, word recognition and reading comprehension were both positively related to indices of integrity of WM in tracts consistently linked to reading skills. However, our findings suggest that when controlling for word recognition skills, reading comprehension is linked to FA of the arcuate fasciculus bilaterally. These results suggest that the association between WM integrity and reading is distinct for word-level versus higher-level processes in reading comprehension.

Keywords (if any): Reading, Brain, White matter

Presenter Name: Johanna Hearn
Classification: Graduate
PI: C. Melanie Schuele

School-Age Word Reading Outcomes for Children with Speech Sound Disorders: A Systematic Review

Johanna Hearn, Grace Phillips, Jacob Feldman, Hannah Krimm, C. Melanie Schuele

Introduction: At first glance, the research indicates that children with speech sound disorders (SSD) are at an increased risk for deficits in reading. However, a more careful analysis suggests other variables, such as language and phonological awareness skills may clarify which children with SSD may be at increased risk for difficulty learning to read. A careful analysis of the extant literature will help clarify which skills have been investigated as correlates between SSD and word level reading skills, elucidate the role of language and phonological awareness skills in this area, and suggest future research directions. The following questions will be answered: (a) Of the articles that have investigated the relation between SSD and single word reading skills at school-age, how many report a statistically significant correlation? (b) What factors have been investigated as potential correlates of single word reading in school-age children with SSD? (c) What percentage of articles that assessed role of a) language and/or b) phonological awareness found positive evidence of its influence on word reading skills in school-age children with SSD?

Methods: A primary systematic search of five databases was conducted in PsychINFO, ProQuest Dissertations, PsychArticles, and ERIC. 3526 articles were retrieved, including 3001 unique articles. Over 34 articles met inclusion and exclusion criteria and were included in the final review. A forward, backward, and gray literature search are currently undergoing and are anticipated to add 5 to 10 articles to the final review. All screening and extraction was completed by two reviewers who completed consensus on all disagreements.

Results: Results from this systematic review will illuminate the state of the literature in the area of SSD and word level reading skills at school-age. A better understanding of skills correlated with SSD and reading difficulty will help speech-language pathologists and educators identify children who are most at risk and provide appropriate testing and treatment as necessary. A future direction for this work includes completing a meta-analysis to quantitatively demonstrate the strength and nature of these correlations.

Discussion: Results from this systematic review will illuminate the state of the literature in the area of SSD and word level reading skills at school-age. A better understanding of skills correlated with SSD and reading difficulty will help speech-language pathologists and educators identify children who are most at risk and provide appropriate testing and treatment as necessary. A future direction for this work includes completing a meta-analysis to quantitatively demonstrate the strength and nature of these correlations.

Keywords (if any): Speech, Reading, Literacy

Presenter Name: Gabriela Herrera Espinosa
Classification: Graduate
PI: Hodapp, Robert

Mental Health Access for Individuals with Disabilities in Tennessee: Experiences of Hispanic and Latinx caregivers.

Gabriela Herrera Espinosa, Leah Sulmonetti, Verity Rodrigues, Robert M. Hodapp

Introduction: Over the past decade, mental health access has been a growing concern across the United States. With the rising prevalence of mental health conditions such as anxiety and depression, the need for specialized and comprehensive mental health supports has never been more crucial. The current study aimed to address the unique barriers Hispanic and Latinx parents and caregivers face when accessing culturally and linguistically appropriate mental health supports for their children.

Methods: In this ongoing study, we performed a statewide needs assessment to examine the barriers and experiences that caregivers/parents face when accessing mental health services for their child with a disability and a co-occurring mental health concern. The survey was distributed throughout Tennessee and was translated into Spanish to retrieve information on the experiences of Hispanic and Latinx caregivers and parents. Respondents were asked questions relating to 7 areas: (1) demographic Information about themselves; (2) information about their child with disabilities and mental/behavioral health concerns; (3) their child's medical history as related to mental/ behavioral health; (4) their child's abilities; (5) child, family, and community-based services; (6) barriers to their child receiving mental health services, as well as social, health and recent life changes; and (7) reflections about existing and needed mental/behavioral health services.

Results: Mental health supports and services that consider the unique needs of individuals with disabilities and their families are critical to eradicate the disparities in mental health access. Both Hispanic and Non-Hispanic caregivers expressed frustration when it comes to mental health providers turning their children away due to a lack of training and knowledge on disability services. A special focus must be given to the experiences of families from diverse backgrounds, including the Hispanic and Latinx communities, to create culturally and linguistically diverse mental/behavioral health supports.

Discussion: Mental health supports and services that consider the unique needs of individuals with disabilities and their families are critical to eradicate the disparities in mental health access. Both Hispanic and Non-Hispanic caregivers expressed frustration when it comes to mental health providers turning their children away due to a lack of training and knowledge on disability services. A special focus must be given to the experiences of families from diverse backgrounds, including the Hispanic and Latinx communities, to create culturally and linguistically diverse mental/behavioral health supports.

Keywords (if any): mental health, access, parents

Presenter Name: Makayla Honaker
Classification: Research staff
PI: Warren, Zachary

Comparing Parent Perceptions of Telehealth and In-Person Evaluations for Assessment of Autism in Toddlers

Makayla G. Honaker, Laura L. Corona, Anna Kathleen Spitler, Amy R. Swanson, Zachary E. Warren

Introduction: Over the past several years, use of telehealth for the assessment of autism spectrum disorder (ASD) in toddlers has increased substantially. Parent-mediated tele-assessment involves parents completing play-based tasks with their children, while a psychologist observes remotely. Past research, completed in a controlled clinic setting, has shown that both families and clinicians find this mode of assessment to be useful and acceptable (Corona et al., 2020). This presentation focuses on data from a study evaluating use of parent-mediated tele-assessment within families' homes. Specifically, these data examine parent perceptions of telehealth evaluation in comparison to traditional in-person evaluation.

Methods: Across two sites (Vanderbilt University Medical Center and University of California Davis), participants were recruited through referrals from state Part C early intervention systems, referrals from primary care providers, and a large-scale community screening survey using the Modified Checklist for Autism in Toddlers (MCHAT). Enrolled families completed initial evaluation via telehealth, including use of the TELE-ASD-PEDS (TAP; Corona et al., 2020) and Developmental Profile 4 (DP-4; Alpern, 2020). Families were then randomized to receive an in-person appointment or a second telehealth appointment, either completed with a different examiner. This submission focuses on families randomized to receive an in-person appointment, which included administration of the Mullen Scales of Early Learning (MSEL, 1995), Vineland Adaptive Behavior Scales, Third Edition (VABS-3, 2016), and Autism Diagnostic Observation Schedule (ADOS-2, 2012). Following both visits, parents completed questionnaires focused on their perceptions of each appointment.

Results: These data suggest that many parents have positive experiences with both in-person and telehealth assessment, yet a majority prefer in-person assessment when given a direct choice. Feedback from parents will be used to continue tailoring telehealth evaluations to best meet family needs.

Discussion: These data suggest that many parents have positive experiences with both in-person and telehealth assessment, yet a majority prefer in-person assessment when given a direct choice. Feedback from parents will be used to continue tailoring telehealth evaluations to best meet family needs.

Keywords (if any): Autism Spectrum Disorder, Parent Perceptions, Telehealth

References (if any):

Corona, L. L., Weitlauf, A. S., Hine, J., Berman, A., Miceli, A., Nicholson, A., Stone, C., Broderick, N., Francis, S., Juárez, A. P., Vehorn, A., Wagner, L., & Warren, Z. (2020). Parent perceptions of caregiver-mediated telemedicine tools for assessing autism risk in toddlers. Journal of Autism and Developmental Disorders, 1-11. https://doi.org/10.1007/s10803-020-04554-9

Presenter Name: Natalie Huerta
Classification: Graduate
PI: Cutting, Laurie E.

The Role of Word Importance in Passage Reading Miscues

Natalie B. Huerta, Tin Q. Nguyen, Jessica A.R. Logan, Laurie E. Cutting

Introduction: Accurate fluent reading predicts reading comprehension. Word-level characteristics such as word frequency have been shown to predict children's decoding miscues that hinder fluency. This study investigated whether another word-level feature known as Term Frequency-Inverse Document Frequency (TF-IDF) was predictive of word-reading miscues above and beyond word frequency. TF-IDF is an approach commonly used in text analysis to identify relevant or important words in a passage by comparing the frequency of a word within the target passage to its frequency across a provided corpus. For example, the word the would have a low TF-IDF because it occurs frequently in the target text, but also occurs frequently across all other texts in the corpus. If TF-IDF predicts reading miscues beyond word frequency, it would support its inclusion in future models predicting reading comprehension. TF-IDF is of particular interest because of its ability to select keywords, which have been shown to have significant instructional support for reading comprehension and could provide instructional implications for decoding instruction and text previewing.

Methods: 93 participants (mean age = 12.02) read a 305 word, experimenter-created passage out loud. The TF-IDF, standard frequency index (SFI), and decodability scores were calculated for each word in the passage. The TF-IDF of the passage words was calculated within the CLEAR corpus. Participant recordings of passage readings were scored for miscues including mispronunciations, substitutions and omissions. R was used to run hierarchical mixed effects logistic regression models to predict probability of word reading miscue and determine best model fit.

Results: The significant interaction and improved model fit support the hypothesis that SFI and TF-IDF are not redundant and indicate that including TF-IDF as a word-level predictor for passage comprehension in future analyses is warranted.

Discussion: The significant interaction and improved model fit support the hypothesis that SFI and TF-IDF are not redundant and indicate that including TF-IDF as a word-level predictor for passage comprehension in future analyses is warranted.

Keywords (if any): word importance, reading, miscues

Presenter Name: Isabella Jackson
Classification: Undergraduate
PI: Olatunji, Bunmi

Differentiating the unique and combined effects of multiple-context and multiple-stimulus cues in exposure therapy: A behavioral investigation of inhibitory retrieval

Isabella F. Jackson, Sarah C. Jessup, Bunmi Olatunji

Introduction: Approximately 31% of adults in the United States experience an anxiety disorder in their lifetime. Exposure therapy involves repeated confrontation of feared stimuli and is the most effective treatment for anxiety disorders. During exposure therapy, the original fear association (e.g., snake = bite) is weakened as a new inhibitory association (snake = no bite) is built. However, up to 62% of individuals experience a return of fear. Two strategies may lower the return of fear after exposure therapy by increasing the generalizability of the inhibitory (i.e., safety) association: exposure therapy in multiple contexts or exposure therapy with multiple stimuli. Although these exposure augmentation strategies have shown promise in the conditioning literature, no studies to date have examined the comparative efficacy of these strategies in a clinical exposure study. This study will examine whether exposure therapy in multiple contexts (MC), with multiple stimuli (MS), or a combined multiple-context, multiple-stimulus exposure (MC/MS) will be most effective in strengthening inhibitory learning and reducing the return of fear. The study will also examine exposure process variables (e.g., habituation, distress variability) as potential mechanisms predicting treatment outcome.

Methods: A total of 135 community adults entered the study by completing a phone screen that administered the Anxiety Disorders Interview Schedule for DSM-5 and meeting the clinical criteria for snake phobia. Participants were randomized into one of three conditions: MC, MS, or MC/MS. For the MS group, four snakes that varied in size, appearance, and speed were shown. For the MC group, the environment of the exposure videos consisted of four locations in which the snakes may be encountered- leaves, woods, a garage, and a bathroom. The MC/MS group was shown the four varied snakes across the four different environments. Each participant completed two video-based exposure sessions within four days. A behavioral approach task (BAT) was administered at pre-exposure, post-exposure, and a one-week follow-up to measure group differences in snake avoidance across time. Subjective units of distress (SUDS) were collected during exposure and used to calculate process variable scores.

Keywords (if any): exposure therapy, anxiety

Presenter Name: Cindy Jaramillo
Classification: Undergraduate
PI: Kaczkurkin, Antonia

Relationship between Social Anxiety and Working Memory as Supported by Brain Structure

Cindy Jaramillo, Camille Archer, Myrsine Kostoulas, Amar S. Camara, Antonia N. Kaczkurkin

Introduction: Prior work has shown increased error monitoring, safety behavior, and self-focused attention in individuals with social anxiety disorder (SAD) during various tasks, such as mixed-antisaccade, the Wisconsin Card Sorting Test, and other neuropsychological assessments. However, it remains to be determined whether these behaviors are associated with deficits in executive functioning, specifically in working memory. If so, it will then be important to elucidate potential structural changes in regions associated with executive functioning in individuals with social anxiety that may underlie the observed behavioral deficits.

Methods: Many studies have examined social anxiety, executive functioning, and structural differences as separate entities, but few studies have considered associations together in one study in samples of youth. We examined 10,692 9- to 10-year-olds with clean structural imaging data, symptoms of social anxiety, and a measure of working memory performance via a list sorting task.

Results: Interestingly, areas typically associated with working memory such as the frontal regions were not found to be significantly associated with social anxiety symptoms in the current study. The results of this study demonstrate that greater social anxiety symptoms are associated with deficits in working memory and reduced volume of brain regions underlying general memory and emotional processes. The absence of an effect in frontal regions associated with working memory specifically suggests that emotional dysregulation may interfere with memory processes.

Discussion: Interestingly, areas typically associated with working memory such as the frontal regions were not found to be significantly associated with social anxiety symptoms in the current study. The results of this study demonstrate that greater social anxiety symptoms are associated with deficits in working memory and reduced volume of brain regions underlying general memory and emotional processes. The absence of an effect in frontal regions associated with working memory specifically suggests that emotional dysregulation may interfere with memory processes.

Keywords (if any): social anxiety, brain structure, executive functioning

Presenter Name: Hee Jung Jeong
Classification: Graduate
PI: Kaczkurkin, Antonia

Environmental Stressors Predicting Psychopathology at the Longitudinal Level

Hee Jung Jeong, Gabrielle E. Reimann, E. Leighton Durham, Camille Archer, Tyler M. Moore, Antonia N. Kaczkurkin

Introduction: Mental health disorders linked to early life stress are more intense, long-lasting, and resistant to treatment compared to disorders not associated with early life stress (McLaughlin et al., 2010; Wade, Wright, & Finegold, 2022). Prior work examining the link between early life stress and psychopathology has been limited by studying a single environmental risk factor in isolation and relying on categorical mental health diagnoses. Research suggests that the nature of psychopathology is better represented as a hierarchy, with a general factor of psychopathology representing transdiagnostic features across all psychopathological symptoms, and specific factors capturing distinctive features (Conway et al. 2019; Zald & Lahey, 2017). Hierarchical modeling can also be used to delineate commonality among multiple stressors, which often co-occur (Smith & Pollak, 2021). Using a longitudinal design, the current study examined whether environmental stressors experienced during development predict psychopathology symptoms at a future time point. It was hypothesized that various stressors, represented by the general and specific environmental stress factors, would predict psychopathology symptoms.

Methods: The data were obtained from the Adolescent Brain Cognitive Development (ABCD) Study at baseline (age 9-10 years) and the third-year follow-up (N = 6,251). Bifactor modeling was used to derive a general factor of environmental stress that encompasses the shared variance among items reflecting stressors, as well as specific subfactors (i.e., familial risk, interpersonal support, neighborhood SES deprivation, and urbanicity) that account for the covariance unique to those subtypes of stressors (Jeong et al., 2022). Bifactor modeling was also employed to derive a general factor of psychopathology and specific subfactors (i.e., internalizing symptoms, conduct problems, ADHD symptoms) (Moore et al., 2020). Structural equation modeling was performed, with environmental stress factors at baseline predicting psychopathology symptoms at the third-year follow-up.

Results: The current study illustrates that various environmental stressors predict greater psychopathology symptoms longitudinally, supporting a link between early life stress and the development of psychopathology. These results demonstrate that novel hierarchical modeling approaches can be used to better understand the environmental risk factors that may contribute to psychopathology symptoms in youth.

Discussion: The current study illustrates that various environmental stressors predict greater psychopathology symptoms longitudinally, supporting a link between early life stress and the development of psychopathology. These results demonstrate that novel hierarchical modeling approaches can be used to better understand the environmental risk factors that may contribute to psychopathology symptoms in youth.

Keywords (if any): Psychopathology, Early Life Stress, Longitudinal Association

References (if any):

Conway, C. C., Forbes, M. K., Forbush, K. T., Fried, E. I., Hallquist, M. N., Kotov, R., ... & Eaton, N. R. (2019). A hierarchical taxonomy of psychopathology can transform mental health research. Perspectives on psychological science, 14(3), 419-436.
Jeong, H. J., Moore, T. M., Durham, E. L., Reimann, G. E., Dupont, R. M., Cardenas-Iniguez, C., ... & Kaczkurkin, A. N. (2023). General and Specific Factors of Environmental Stress and Their Associations With Brain Structure and Dimensions of Psychopathology. Biological Psychiatry Global Open Science, 3(3), 480-489.
McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Childhood adversities and adult psychopathology in the National Comorbidity Survey Replication (NCS-R) III: Associations with functional impairment related to DSM-IV disorders. Psychological Medicine, 40(5), 847-859.
Moore, T. M., Kaczkurkin, A. N., Durham, E. L., Jeong, H. J., McDowell, M. G., Dupont, R. M., ... & Lahey, B. B. (2020). Criterion validity and relationships between alternative hierarchical dimensional models of general and specific psychopathology. Journal of abnormal psychology, 129(7), 677.
Smith, K. E., & Pollak, S. D. (2021). Rethinking Concepts and Categories for Understanding the Neurodevelopmental Effects of Childhood Adversity. Perspectives on Psychological Science, 16(1), 67-93.
Wade, M., Wright, L., & Finegold, K. E. (2022). The effects of early life adversity on children's mental health and cognitive functioning. Translational Psychiatry, 12(1), 1-12.
Zald, D. H., & Lahey, B. B. (2017). Implications of the hierarchical structure of psychopathology for psychiatric neuroimaging. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 2(4), 310-317.

Presenter Name: Lana Jeradeh Boursouian
Classification: Faculty
PI: Jeradeh Boursoulian, Lana

Investigating the Real-world Efficacy of Selective Serotonin Reuptake Inhibitors for Treating Anxiety in Autistic Youth

Lana Jeradeh Boursoulian, M.D. (VKC faculty), Zachary J. Williams (VKC trainee), Tonnar Castellano (VDSI trainee), J. Christopher Slaughter, DrPH (VDSI faculty)

Introduction: Pediatric patients with autism spectrum disorder (ASD) present with a very high prevalence of comorbid anxiety disorders, with one meta-analysis reporting that 39.6% of youth with ASD have at least one co-occurring anxiety disorder. Anxiety symptoms are frequently elevated in ASD compared to the general population. Anxiety negatively impacts the function of autistic youth and contributing to frequent health care utilization. The evidence base for SSRIs in autism is extremely lacking, and additional studies are required to guide clinical practice. The literate about the use of Serotonin Reuptake Inhibitors have targeted repetitive behaviors as a primary outcome rather than anxiety.

Methods: The Autism Treatment Network (ATN) database Contains de-identified clinical data from pediatric patients with ASD and contains Questionnaires, medical diagnoses, and medication records. The primary goal to investigate whether the prescription of SSRI medications is associated with reduced anxiety and improved quality of life in the ASD. Outcomes accessed CBCL Anxiety Raw core (primary outcome) Others secondary outcomes included CBCL Internalizing Raw Score, CBCL Externalizing Raw Score, CBCL Somatic Complaints Raw Score, CBCL Aggression Raw Score, CBCL ADHD Problems, Parent GI Complaints, Parent Sleep Complaints, Parent Sensory Complaints, Parent Self-injury Complaints, CSHQ Total Score, ABC Irritability Score. Charts with at least 2 visits off and on an SSRI were included Anxiety reported by Parent-reported problem list Anxiety medication was indicted or reported at one or more visits before SSRI medication was initiated Only visits at age 6 years and greater were counted The index visit: the first observed visit at which anxiety was noted. Earlier visits from before the onset of that child's anxiety were not included in the analyses. Continuous outcomes were analyzed in a Bayesian multilevel modeling framework. Binary outcomes were analyzed using a Bernoulli likelihood (i.e., a binomial likelihood with a single trial)

Results: The results of this analysis support the use of SSRIs as a first-line treatment for anxiety in autistic children between the ages of 6 and 18 years for treatment of internalizing symptoms. Careful monitoring of GI and sleep issues is recommended. Future studies should determine whether these medications are helpful in treating somatic complaints in autistic individuals who do not meet the criteria for a co-occurring anxiety disorder (i.e., as adjunctive therapy for functional gastrointestinal disorders or insomnia).

Discussion: The results of this analysis support the use of SSRIs as a first-line treatment for anxiety in autistic children between the ages of 6 and 18 years for treatment of internalizing symptoms. Careful monitoring of GI and sleep issues is recommended. Future studies should determine whether these medications are helpful in treating somatic complaints in autistic individuals who do not meet the criteria for a co-occurring anxiety disorder (i.e., as adjunctive therapy for functional gastrointestinal disorders or insomnia).

Keywords (if any): Selective Serotonin Reuptake Inhibitors, Autism, Anxiety

References (if any):

Anxiety disorders in children and adolescents with autistic spectrum disorders: a meta-analysisF. J. van Steensel, S. M. Bögels and S. Perrin Clin Child Fam Psychol Rev 2011 Vol. 14 Issue 3 Pages 302-17.

Selective Serotonin Reuptake Inhibitor Monotherapy for Anxiety Disorders in Children and Adolescents with Autism Spectrum Disorder: A Chart Review

G. Thorkelson, S. F. Laughlin, K. S. Turner, N. Ober and B. L. Handen J Child Adolesc Psychopharmacol 2019 Vol. 29 Issue 9 Pages 705-711 Accession Number: 31295004 DOI: 10.1089/cap.2019.0001

The SOFIA Study: Negative Multi-center Study of Low Dose Fluoxetine on Repetitive Behaviors in Children and Adolescents with Autistic Disorder

P. Herscu, B. L. Handen, L. E. Arnold, M. F. Snape, J. D. Bregman, L. Ginsberg, et al. J Autism Dev Disord 2020 Vol. 50 Issue 9 Pages 3233-3244 Accession Number: 31267292 DOI: 10.1007/s10803-019-04120-y

Health care access and treatment for children with co-morbid autism and psychiatric conditions B. K. Ahmedani and R. M. Hock Soc Psychiatry Psychiatr Epidemiol 2012 Vol. 47 Issue 11 Pages 1807-14

Presenter Name: Amanda Johnston
Classification: Graduate
PI: Burke, Meghan

Developing a Service Access Measure for Parents of Individuals with Autism

Amanda N. Johnston, Meghan M. Burke

Introduction: Services are critical to the outcomes of individuals with autism across the lifespan (Estes et al., 2015; Reichow, 2012; Warren et al., 2011). Yet, current methods to measure service access are often limited to counting the number of services received (Burke et al., in press). Services are inherently nuanced as they are based on an individual's needs and ability to access such services. To accurately understand the effect of services, developing a comprehensive measure of service access is critical.

Methods: We developed a robust measure to gauge service access using feedback from families of individuals with autism. The measure was developed in English and Spanish. The measure was piloted with 26 parents of youth with autism (children aged 3 to 5) in English and Spanish. Descriptive and reliability statistics were conducted to explore the measure as a construct. Further, inferential statistics were conducted to examine how service access differed across participants. Also, we examined field notes in administering the service access measure to determine any needed changes; field notes were examined using constant comparative analysis (Glaser & Strauss, 1967).

Results: Prior research in accessing services has traditionally been based on an individual's need for such services. However, such measurements focus on gaining additional services over time without considering if individual needs are being met simultaneously. As such, it is important to consider measures that determine the number of services acquired and whether individual needs are being met across any needed service. Additionally, as participants reported not looking for services as the most frequent barrier to service access, limited knowledge of specific services to meet individual needs might exist.

Discussion: Prior research in accessing services has traditionally been based on an individual's need for such services. However, such measurements focus on gaining additional services over time without considering if individual needs are being met simultaneously. As such, it is important to consider measures that determine the number of services acquired and whether individual needs are being met across any needed service. Additionally, as participants reported not looking for services as the most frequent barrier to service access, limited knowledge of specific services to meet individual needs might exist.

Keywords (if any): autism, service access

References (if any):

Glaser, B., & Strauss, A. (1967). The discovery of grounded theory; strategies for qualitative research. Aldine Pub. Co.

Estes, A., Munson, J., Rogers, S. J., Greenson, J., Winter, J., & Dawson, G. (2015). Long-Term Outcomes of Early Intervention in 6-Year-Old Children With Autism Spectrum Disorder. Journal of the American Academy of Child & Adolescent Psychiatry, 54(7), 580-587. https://doi.org/10.1016/j.jaac.2015.04.005

Reichow, B. (2012). Overview of Meta-Analyses on Early Intensive Behavioral Intervention for Young Children with Autism Spectrum Disorders. Journal of Autism and Developmental Disorders, 42(4), 512-520. https://doi.org/10.1007/s10803-011-1218-9

Warren, Z., McPheeters, M. L., Sathe, N., Foss-Feig, J. H., Glasser, A., & Veenstra-VanderWeele, J. (2011). A Systematic Review of Early Intensive Intervention for Autism Spectrum Disorders. Pediatrics, 127(5), e1303-e1311. https://doi.org/10.1542/peds.2011-0426

Presenter Name: Dorita Jones
Classification: Research staff
PI: Key

Social functioning in male and female adults with autism relies on similar but not identical neural mechanisms

Alexandra P. Key, Dorita Jones, Mark Klemencic, Blythe A. Corbett

Introduction: Due to higher incidence of autism diagnosis in males than females (Maenner et al., 2023), research on biological sex differences has been limited, but recent findings suggest distinct strengths and difficulties in males vs. females with autism (Corbett et al., 2020; Harrop et al., 2018; Key et al., 2022a,b; Lawson, 2019): Autistic females may demonstrate greater motivation toward developing friendships and use more compensatory behaviors in social contexts than autistic males (Lawson, 2019; Mandy et al., 2012). Autistic females demonstrated more neurotypical patterns of visual social attention, suggesting that reduced attention to social stimuli could be more characteristic of autistic males (Harrop et al., 2018). Autistic females compared to males showed attenuated N170 response to faces, which correlated with symptom severity in females only (Coffman et al., 2013). Study Objective: This study aimed to characterize biological sex differences in social cognition in adults with autism by examining neural responses associated with sensory-perceptual processing and spontaneous memory for social and nonsocial stimuli. Based on prior findings in adolescents with autism, we hypothesized that in autistic adults: biological sex differences may be observed for neural markers of both sensory-perceptual (e.g., face detection) and higher-order cognitive (e.g., face memory) stages of social information processing brain-behavior associations reflecting individual differences in social functioning will vary based on biological sex.

Methods: EEG: 128-channel net (EGI, Inc), 250 Hz sampling rate, filters: 0.1-30 Hz; average reference

Results: Adults with autism process social visual stimuli using the neural mechanisms for perception and memory previously reported in children and adolescents with autism and in neurotypical populations. Biological sex differences highlight the possible source of variable clinical presentation: Autistic females recruit both sensory-perceptual and memory processes for adaptive social information processing. Autistic males rely primarily on sensory-perceptual processes for social information processing. Future studies should explicitly consider the contributions of biological sex to behavioral and neural characteristics of autism.

Discussion: Adults with autism process social visual stimuli using the neural mechanisms for perception and memory previously reported in children and adolescents with autism and in neurotypical populations. Biological sex differences highlight the possible source of variable clinical presentation: Autistic females recruit both sensory-perceptual and memory processes for adaptive social information processing. Autistic males rely primarily on sensory-perceptual processes for social information processing. Future studies should explicitly consider the contributions of biological sex to behavioral and neural characteristics of autism.

Keywords (if any): autism

References (if any):

Corbett, B. A., Schwartzman, J. M., Libsack, E. J., Muscatello, R. A., Lerner, M. D., Simmons, G. L., & White, S. W. (2020). Camouflaging in autism: Examining sex-based and compensatory models in social cognition and communication. Autism Research, 99(1), 55-16.
Harrop, C., Jones, D., Zheng, S., Nowell, S. W., Boyd, B. A., & Sasson, N. (2018). Sex differences in social attention in autism spectrum disorder. Autism Research, 11(9), 1264-1275.
Key, A. P., & Corbett, B. A. (2014). ERP responses to face repetition during passive viewing: A nonverbal measure of social motivation in children with autism and typical development. Developmental Neuropsychology, 39(6), 474-495.
Key, A. P., Jones, D., & Corbett, B. A. (2022a). Sex differences in automatic emotion regulation in adolescents with autism spectrum disorder. Autism Research, 15(4), 712-728.
Key, A., Yan, Y., Metelko, M., Chang, C., Kang, H., Pilkington, J., & Corbett, B. A. (2022b). Greater social competence is associated with higher interpersonal neural synchrony in adolescents with autism. Frontiers in Human Neuroscience, 828.
Lawson, L. P. (2019). Sex differences in autism spectrum disorders across the lifespan. Current Developmental Disorders Reports, 6, 57-66.
Maenner, M. J., Warren, Z., Williams, A. R., ... Shaw, K. A. (2023). Prevalence and characteristics of autism spectrum disorder among children aged 8 years-autism and developmental disabilities monitoring network, 11 sites, United States, 2020. MMWR Surveillance Summaries, 72(2), 1-14.
Mandy, W., Chilvers, R., Chowdhury, U., Salter, G., Seigal, A., & Skuse, D. (2012). Sex differences in autism spectrum disorder: evidence from a large sample of children and adolescents. Journal of Autism and Developmental Disorders, 42(7), 1304-1313

Presenter Name: Swarat Kulkarni
Classification: Undergraduate
PI: Broadie, Kendal

Glycosphingolipids linked to elevated neurotransmission and neurodegeneration in a Drosophila model of Niemann Pick Type C

Anna E. Eberwein, Swarat S. Kulkarni, Emma Rushton, Kendal Broadie

Introduction: The Niemann Pick diseases are lysosomal lipid storage disorders that cause very early onset neurodegeneration and childhood death. Niemann Pick Type C (NPC) is characterized primarily by the loss of the NPC1 gene, which causes lysosomal accumulation of both cholesterol and glycosphingolipids. Although cholesterol is widely considered to be the primary pathogenic lipid, cholesterol reduction treatments (e.g. cholestyramine, lovastatin) do not impact NPC progressive neurodegeneration. In contrast, miglustat inhibition of glucosylceramide (GlcCer) synthase, the first committed step in the glycosphingolipid (GSL) synthesis pathway, clinically stabilizes NPC patient symptoms. These exciting advances suggest that the glycosphingolipid synthesis pathway may be the key to understanding the NPC condition, and that glycosphingolipid impairments may provide the causal mechanistic link between neurotransmission and neurodegeneration defects.

Methods: To test this hypothesis, we employed our Drosophila NPC disease model together with GSL pathway mutants, using two-electrode voltage-clamp (TEVC) electrophysiological recording, confocal imaging, and lipid mass spectrometry analyses.

Results: This is the first study to test glycosphingolipid (GSL) mechanisms in the Drosophila Niemann Pick Type C (NPC) disease model with a connection between neurotransmission and neurodegeneration defects. The current study fills an important gap, demonstrating elevated neurotransmission and neurodegeneration in npc1a and brn nulls, potentially linked via a common mechanistic pathway. Future studies will need to test cholesterol and glycosphingolipid interconnections in this new, more accessible NPC genetic disease model to determine the cores causal relationships. Nevertheless, we conclude that glycosphingolipid misregulation is clearly linked to neurotransmission upregulation and subsequent neurodegeneration in the Drosophila NPC disease model.

Discussion: This is the first study to test glycosphingolipid (GSL) mechanisms in the Drosophila Niemann Pick Type C (NPC) disease model with a connection between neurotransmission and neurodegeneration defects. The current study fills an important gap, demonstrating elevated neurotransmission and neurodegeneration in npc1a and brn nulls, potentially linked via a common mechanistic pathway. Future studies will need to test cholesterol and glycosphingolipid interconnections in this new, more accessible NPC genetic disease model to determine the cores causal relationships. Nevertheless, we conclude that glycosphingolipid misregulation is clearly linked to neurotransmission upregulation and subsequent neurodegeneration in the Drosophila NPC disease model.

Keywords (if any): Lipid Storage Disease, Neurotransmission, Glucosylceramide

References (if any):

Niemann, 1914; Pick, 1933; Liu et al., 2020; Brady et al., 1966; Newton et al., 2020; Wanikawa et al., 2019; Patterson et al., 2000; Newton et al., 2018; Sylvain et al., 1994; Patterson et al., 2007; Patterson et al., 2020; Platt et al., 1994

Presenter Name: Julia Lebovitz
Classification: Graduate
PI: Park, Sohee

The Impact of Repetitive Negative Thinking on Social Functioning and Well-being in a Transdiagnostic Sample

Julia G. Lebovitz, Alexandra M. Adamis, Laura Doreste-Mendez, Serena Z. Chen, Dustin Phan, Faith Gunning-Dixon, Katherine Burdick

Introduction: Repetitive negative thinking (RNT), including worry and rumination, is a transdiagnostic process involving perseverative, unproductive, and difficult to disengage from thoughts in response to negative emotions. RNT may impede adaptive emotion regulation by prolonging negative mood states, strengthening cognitive biases, and preventing effective problem-solving (Joormann & Stanton, 2016). Accordingly, RNT is a major risk factor for the development and maintenance of both internalizing and externalizing disorders, including major depressive disorder (MDD) and bipolar disorder (BD) (Samtani et al., 2021). While prior research has shown that depression and mania are reliably associated with impaired social functioning and reduced quality of life (Coryell et al., 1993), it is unknown if RNT may play a role in conferring risk for poor psychosocial outcomes. The present study addresses this gap in the literature by examining (1) if RNT predicts social functioning and well-being in a transdiagnostic sample, and (2) if RNT mediates the relationship between symptoms of depression and poor functional outcomes.

Methods: 145 adults were included (19 with BD, 63 with MDD, and 63 with no psychiatric history), aged 45-70 (M = 57.6, SD = 7.1) Each participant completed measures of RNT (Perseverative Thinking Questionnaire; PTQ; Ehring et al., 2011), social functioning impairments (Social Adjustment Scale-Self Report; SAS-SR; Weissman et al., 1999), and subjective well-being (Satisfaction With Life Scale; SWLS; Diener et al., 2010). Symptoms of depression were assessed via clinical interview using the Hamilton Rating Scale for Depression (HAMD; Hamilton, 1986).

Results: Results show that RNT is a significant predictor of key psychosocial outcomes in adulthood, even after accounting for the effects of current depression levels. Results point to RNT as one of the behavioral mechanisms by which symptoms of depression have an effect on functional impairment and well-being. Findings lend support to the notion of RNT as a transdiagnostic cognitive process, and suggest that RNT may be an important therapeutic target for adults with poor social functioning and/or life satisfaction.

Discussion: Results show that RNT is a significant predictor of key psychosocial outcomes in adulthood, even after accounting for the effects of current depression levels. Results point to RNT as one of the behavioral mechanisms by which symptoms of depression have an effect on functional impairment and well-being. Findings lend support to the notion of RNT as a transdiagnostic cognitive process, and suggest that RNT may be an important therapeutic target for adults with poor social functioning and/or life satisfaction.

Keywords (if any): repetitive negative thinking, mood disorders, emotion regulation

Presenter Name: Hyeon-Seung Lee
Classification: Graduate
PI: Park, Sohee

Novel Measures of Social Cognition Captures Improvement Following Virtual Reality Social Skills Training in Schizophrenia.

Hyeon-Seung Lee, Michael Sangimino, Tatiana Baxter, Katrina S. Rbeiz, Ullal Akshith, Joshua Wade, Nilanjan Sarkar and Sohee Park*

Introduction: Social impairments present a major barrier toward better outcome in individuals with schizophrenia (SZ). Social skills and competence protect against stress-related exacerbation of symptoms while supporting interpersonal interactions, social affiliation and improving the quality of life. Existing social interventions can be helpful but suffer from low adherence and weak transfer of skills outside of treatment settings. A viable alternative to conventional therapies is the use of virtual reality (VR) technology to develop interventions that target specific social cognitive mechanisms. Our past study showed the feasibility and acceptability of a VR-based social skills training 'game' for SZ (Adery et al, 2018) in which participants rehearsed everyday social skills in simulated social situations without having to explicitly learn rules of social skills. The present study aimed to test the effectiveness of the VR social intervention on key social cognitive mechanisms and extended the assessment to examine self-disturbance (emotion embodiment) and self-other boundary (interpersonal distance regulation) that may contribute to social impairments but are rarely investigated in the context of treatment.

Methods: 25 SZ participated in VR-based social skills training twice a week for 4 weeks (8 sessions). In each game, the participant was asked to approach an avatar and make appropriate conversations to accomplish social 'missions'. Varying difficulty levels and social settings (bus stop, cafeteria and shop) provided scaffolding approach. Performance indices were the number of missions correctly completed, errors, mission completion time, and latency to engage with an avatar (SEL). At baseline, we assessed clinical symptoms, social functioning, loneliness, embodied emotion, interpersonal distance (IPD) and resting state functional connectivity (rsFMRI) for 25 SZ and 25 matched controls (CO); CO provided baseline comparison data but did not undergo training. Embodied emotion was visualized with a mapping task (emBODY; Nummenmaa et al., 2014). Preferred IPD was assessed with a visual scale to estimate the size of the social comfort space when interacting with another person. For rsFMRI, a hypothesized social brain network including TPJ and STS and a frontoparietal personal space network including diPS and PMv were the regions of interest. Post-treatment assessment was repeated within 2 weeks of completion of the VR training.

Results: Our low-burden VR social skills training game appears to be effective in improving key social cognitive functions in SZ. In addition to improved symptoms and social functioning, we found 'normalization' of embodied emotion and interpersonal distance regulation. Our findings suggest the utility and efficacy of a VR intervention based on simulation and rehearsal of social interactions. Lastly, assessment of self-disturbance and self-other processing might be important to gauge effects of social interventions.

Discussion: Our low-burden VR social skills training game appears to be effective in improving key social cognitive functions in SZ. In addition to improved symptoms and social functioning, we found 'normalization' of embodied emotion and interpersonal distance regulation. Our findings suggest the utility and efficacy of a VR intervention based on simulation and rehearsal of social interactions. Lastly, assessment of self-disturbance and self-other processing might be important to gauge effects of social interventions.

Keywords (if any): schizophrenia, social skill, virtual reality

Presenter Name: Xia Lei
Classification: Research staff
PI: Niswender, Colleen

Activation Mechanisms for Context-Dependent Allosteric Modulation of the mGlu7 receptor

Xia Lei, Alice L. Rodriguez, Colleen Niswender

Introduction: human disorders, the receptor may be an ideal candidate for the development of therapeutics.

As mGlu7 is one of the eight highly related mGlu receptors, it is difficult to develop selective compounds when targeting the orthosteric site. For this reason, our group and others are focused on developing ligands that interact with the receptor via an allosteric mechanism to positively or negatively modulate orthosteric agonist activity. As the affinity of glutamate is very low at mGlu7, the surrogate agonist L-AP4 is often used for compound profiling. We have shown, however, that there are distinctions in the interaction of mGlu7 positive allosteric modulators in the presence of glutamate versus L-AP4. Our current studies extend these findings by profiling the activity of allosteric modulators in the presence of mGlu7-interacting proteins. It is anticipated that understanding the activity of modulators in the presence of these endogenously expressed proteins will be critical to interpretation of native tissue and in vivo effects of mGlu7-targeted modulators.

Methods: We tested the activity of mGlu7 using a series of compound groups, including agonists, positive allosteric modulators, and negative allosteric modulators, through a Ca2+ assay. We used a well-controlled system for dimer expression and a very simple experimental design to mimic the mGlu7/Elfn1 interaction by co-culturing cell lines expressing each protein.

Results: Our data suggest that L-AP4 activates mGlu7 through a different mechanism compared to glutamate. PAMs also potentiate mGlu7 with different mechanisms; with mGlu7-protein interaction, some allosteric modulators show different modulation mechanisms. This will give us an additional tool for drug discovery to link in vitro and in vivo results.

Discussion: Our data suggest that L-AP4 activates mGlu7 through a different mechanism compared to glutamate. PAMs also potentiate mGlu7 with different mechanisms; with mGlu7-protein interaction, some allosteric modulators show different modulation mechanisms. This will give us an additional tool for drug discovery to link in vitro and in vivo results.

Keywords (if any): mGlu7, Allosteric modulator, Elfn1

References (if any):

Fisher NM, Seto M, Lindsley CW and Niswender CM (2018) Metabotropic Glutamate Receptor 7: A New Therapeutic Target in Neurodevelopmental Disorders. Front Mol Neurosci 11: 387.

Dunn HA, Patil DN, Cao Y, Orlandi C and Martemyanov KA (2018) Synaptic adhesion protein ELFN1 is a selective allosteric modulator of group III metabotropic glutamate receptors in trans. Proceedings of the National Academy of Sciences of the United States of America 115(19): 5022-5027.

Presenter Name: Chak Li
Classification: Graduate
PI: Burke, Meghan

Effect of a Legislative Advocacy Program Among Parents of Children with Disabilities

Chak Li, Meghan M. Burke, Zachary Rossetti

Introduction: Although the importance of parent input to inform legislative changes for the reauthorization of the Individuals with Disabilities Education Act (IDEA) is directly enshrined within the statute, parent participation has remained limited throughout past reauthorizations (York, 2005). Given that an IDEA reauthorization is long overdue, it is critical to develop and test interventions to improve parent legislative advocacy. The purpose of this study was to examine the effect of a legislative advocacy program among parents of children with disabilities.

Methods: With 62 parents of children with disabilities, we conducted a randomized controlled trial (RCT) to determine the efficacy of an advocacy program. Inclusionary criteria required participants to be: parents of children with disabilities, interested in an advocacy program, and willing to complete the research measures. On average, participants were 43.80 (SD = 8.74) years of age. Most participants were mothers. Over 40% of the sample reflected racial/ethnic minority backgrounds. The children of the participants were, on average, 11.10 (SD = 4.47) years of age. The most common type of disability was autism. There were no significant demographic differences between the intervention and waitlist-control groups. To determine if there was a change in special education knowledge (Burke et al., 216), empowerment (Koren et al., 1992), and motivation (Perry et al., 1992) from the pre to the post survey, we conducted multivariate analysis of covariance (MANCOVA). For changes in civic engagement (Jackson-Elmore et al., 2001) and advocacy activities (Li et al., submitted), we conducted MANCOVA between pre and follow-up survey scores.

Results: The program was effective in increasing motivation only and these results contrast with prior studies where parent advocacy programs were found to increase participants' knowledge (Burke et al., 2016) and empowerment (Taylor et al., 2017). Second, the program did have a significant impact on broad civic engagement and advocacy activities which expands on the findings of a previous study which demonstrated an increase in advocacy activities (Burke et al., 2022). Overall, these findings reinforce the benefits of expanding legislative advocacy programs as it would motivate parents of children with disabilities to engage in civic engagement and advocacy activities, increasing the likelihood for systematic issues within the field of special education to be addressed.

Discussion: The program was effective in increasing motivation only and these results contrast with prior studies where parent advocacy programs were found to increase participants' knowledge (Burke et al., 2016) and empowerment (Taylor et al., 2017). Second, the program did have a significant impact on broad civic engagement and advocacy activities which expands on the findings of a previous study which demonstrated an increase in advocacy activities (Burke et al., 2022). Overall, these findings reinforce the benefits of expanding legislative advocacy programs as it would motivate parents of children with disabilities to engage in civic engagement and advocacy activities, increasing the likelihood for systematic issues within the field of special education to be addressed.

Keywords (if any): civic engagement, advocacy, parent perspective

References (if any):

Burke, M. M., & Hodapp, R. M. (2016). The nature, correlates, and conditions of parental advocacy in special education. Exceptionality, 24(3), 137-150.

Burke, M., Rossetti, Z., & Li, C. (2022). The efficacy and impact of a special education legislative advocacy program among parents of children with disabilities. Journal of Autism and Developmental Disorders, 52(7), 3271-3279. Koren, P. E., DeChillo, N., & Friesen, B. J. (1992). Measuring empowerment in families whose children have emotional disabilities: a brief questionnaire. Rehabilitation psychology, 37(4), 305.

Taylor, J. L., Hodapp, R. M., Burke, M. M., Waitz-Kudla, S. N., & Rabideau, C. (2017). Training parents of youth with autism spectrum disorder to advocate for adult disability services: Results from a pilot randomized controlled trial. Journal of autism and developmental disorders, 47, 846-857.

Presenter Name: Natalie Libster
Classification: Postdoc
PI: Taylor, Julie Lounds

Social Experiences and Mental Health Outcomes Among Autistic LGBTQ+ Youth

Natalie Libster, Ph.D., Ryan Adams, Ph.D., Somer Bishop, Ph.D., Shuting Zheng, Ph.D., & Julie Lounds Taylor, Ph.D.

Introduction: Youth who identify as autistic and those who identify as LGBTQ+ are at increased risk of experiencing peer victimization, exclusion, and internalizing symptoms (Adams et al., 2014; Bottema-Beutel et al., 2019; Moran et al., 2017). These two identities often overlap, as greater gender and sexual orientation diversity is found in the autistic population than in the general population (Dewinter et al., 2017). The double minoritized identities of autistic LGBTQ+ youth may exponentiate their risk of having negative peer experiences and poor mental health (Strang et al., 2023). This study examined whether certain social experiences are associated with depression and psychological quality of life (QoL) among autistic youth, and whether the impact of these experiences on mental health differs across sexual and gender minority groups.

Methods: Autistic youth (N=207) between 15-25 years old (M=18.65) with IQ above 70 participated in the current study. Data for the current analysis was collected via online survey. Participants completed a demographic questionnaire that included their biological sex, gender, and sexual orientation. Responses were coded into one of three gender/sexual identity groups: 1) Cisgender heterosexual (n=128; 108 male); 2) Cisgender non-heterosexual (n=61; 42 male); and 3) Gender-sexual minority (n=18; 7 male). Participants further completed questionnaires measuring various social experiences, including school liking and avoidance (School Liking and Avoidance Questionnaire; Ladd et al, 2000), victimization (Schwartz Peer Victimization Scale-Revised; Schwartz et al., 2002), and being ignored (Ostracism Experiences Scale for Adolescence; Gilman et al., 2013). Finally, participants completed measures of depression (Beck Depression Inventory-II; Beck et al., 1996) and psychological QoL (WHOQoL-BREF; 1998). Linear regression and moderation analyses were conducted. Sex, age, IQ, and autism symptom severity were included as covariates.

Results: This study highlights the importance of school-based interventions to increase school liking and positive peer experiences among autistic youth. These interventions are especially crucial for LGBTQ+ autistic youth, who are at increased risk of experiencing victimization, negative feelings about school, and poor mental health.

Discussion: This study highlights the importance of school-based interventions to increase school liking and positive peer experiences among autistic youth. These interventions are especially crucial for LGBTQ+ autistic youth, who are at increased risk of experiencing victimization, negative feelings about school, and poor mental health.

Keywords (if any): Autism, LGBTQ+, mental health

References (if any):

Adams, R. E., Fredstrom, B. K., Duncan, A. W., Holleb, L. J., & Bishop, S. L. (2014). Using self-and parent-reports to test the association between peer victimization and internalizing symptoms in verbally fluent adolescents with ASD. Journal of Autism and Developmental Disorders, 44, 861-872. Doi: 10.1007/s10803-013-1938-0.

Beck A. T., Steer R. A., Brown G. K. (1996). Manual for the Beck Depression Inventory-II. San Antonio, TX:Psychological Corporation.

Bottema-Beutel, K., Cuda, J., Kim, S. Y., Crowley, S., & Scanlon, D. (2020). High school experiences and support recommendations of autistic youth. Journal of Autism and Developmental Disorders, 50, 3397-3412. Doi:10.1007/s10803-019-04261-0.

Dewinter, J., De Graaf, H., & Begeer, S. (2017). Sexual orientation, gender identity, and romantic relationships in adolescents and adults with autism spectrum disorder. Journal of Autism and Developmental Disorders, 47, 2927-2934. Doi:10.1007/s10803-017-3199-9.

Gilman, R., Carter-Sowell, A., DeWall, C. N., Adams, R. E., & Carboni, I. (2013). Validation of the ostracism experience scale for adolescents. Psychological assessment, 25(2), 319-330. Doi:10.1037/a0030913.

Ladd, G. W., Buhs, E. S., & Seid, M. (2000). Children's initial sentiments about kindergarten: Is school liking an antecedent of early classroom participation and achievement? Merrill-Palmer Quarterly, 6(2), 255-279.

Moran, T. E., Chen, C. Y. C., & Tryon, G. S. (2018). Bully victimization, depression, and the role of protective factors among college LGBTQ students. Journal of Community Psychology, 46(7), 871-884. Doi: 10.1002/jcop.21978. Schwartz, D., Farver, J. M., Chang, L., & Lee-Shin, Y. (2002). Victimization in South Korean children's peer groups. Journal of Abnormal Child Psychology, 30, 113-125. Doi:10.1023/A:1014749131245.

Strang, J. F., Anthony, L. G., Song, A., Lai, M. C., Knauss, M., Sadikova, E., ... & Kenworthy, L. (2023).In addition to stigma: Cognitive and autism-related predictors of mental health in transgender adolescents. Journal of clinical child & adolescent psychology, 52(2), 212-229. Doi:10.1080/15374416.2021.1916940.

The WHOQOL Group (1998). Development of the World Health Organization WHOQOL-BREF quality of life assessment. Psychological Medicine, 28(3), 551-558. Doi:10.1017/s0033291798006667.

Presenter Name: Anne Byrd Mahoney
Classification: Postdoc
PI: Gilmer, Mary Jo

Child and Caregiver Perspectives on COVID-19 Experiences During Pediatric Cancer Treatment: A Mixed Methods Approach

Anne Byrd Mahoney, Jennifer Newton, Brittany Cowfer, Mary Jo Gilmer

Introduction: The COVID-19 pandemic significantly affected physical and psychosocial well-being of families across the United States. This public health crisis brought about added challenges for vulnerable groups, including children undergoing treatment for advanced cancer and their caregivers. As part of a larger longitudinal study, the aim of this research was to investigate the viewpoints of both children and caregivers regarding the impact of COVID-19 during pediatric cancer treatment. This cross-sectional, mixed-methods design involved analysis of surveys examining COVID-19-related experiences as well as semi-structured interviews that were conducted midway through an animal-assisted intervention research project.

Methods: Children ages 8-16 undergoing treatment for advanced cancer and their caregivers were recruited from one academic medical center in the southeastern United States. A 20-item survey was administered to assess caregivers' (n=14) experiences and perceptions related to the pandemic. A similar 11-item survey was administered to children (n=11). Questions focused on mood, anxiety, technology usage, sleep, physical activity, medical needs, and access to the health care team. Semi-structured interviews examined caregiver (n=14) and child (n=13) perspectives of the impacts of the COVID-19 pandemic. A thematic content analysis identified key themes and patterns within the interview transcripts.

Results: Themes of psychological impact and isolation, while prominent in some caregivers and children during interviews, were not as often described in survey data. Surveys did not ask participants questions surrounding positive changes, which emerged as a significant theme in interviews. Surveys demonstrated increased reliance on technology, which was reflected in child interviews and not as often among adults, though this may be due to specific prompts in child interviews. These results indicate the importance of a mixed-methods approach when assessing child and caregiver perspectives. Future studies should strive to incorporate both quantitative and qualitative data to fully understand families' experiences.

Discussion: Themes of psychological impact and isolation, while prominent in some caregivers and children during interviews, were not as often described in survey data. Surveys did not ask participants questions surrounding positive changes, which emerged as a significant theme in interviews. Surveys demonstrated increased reliance on technology, which was reflected in child interviews and not as often among adults, though this may be due to specific prompts in child interviews. These results indicate the importance of a mixed-methods approach when assessing child and caregiver perspectives. Future studies should strive to incorporate both quantitative and qualitative data to fully understand families' experiences.

Keywords (if any): childhood cancer, animal-assisted interactions, COVID-19

Presenter Name: Mackenzie Lighterink
Classification: Graduate
PI: Gifford, Rene

Audiovisual Integration and Cortical Responses to Speech in Pediatric Cochlear Implant Users

Mackenzie Lighterink, BA, Rene Gifford, PhD, Eric Larson, PhD, Adrian K.C. Lee, ScD, Mark Wallace, PhD

Introduction: Despite significant improvements in cochlear implant technology, speech understanding outcomes have remained highly variable. Cortical activation across different sensory modalities, as well as audiovisual (AV) benefit, are two under-researched variables that could be affecting cochlear implant performance. The impact of cross-modal activation in the auditory cortex to visual stimuli, which has been documented in pediatric cochlear implant users, is not well understood and has only been studied in the auditory-only domain without consideration for audiovisual processing abilities. Additionally, there is a lack of functional neuroimaging research in the cochlear implant population due to difficulties obtaining fMRI results. The purpose of this study was to 1) quantify AV benefit on tasks of behavioral speech perception, 2) characterize AV processing and cross-modal activation at a cortical level within regions of interest (ROI) in the temporal lobe, and 3) evaluate the relation between patterns of cortical activation, AV benefit, and speech perception.

Methods: Currently, 15 bilaterally implanted pediatric CI users between the ages of 6 and 15 years old have participated in this study. Behavioral testing included auditory-only speech recognition tasks, as well as both a multimodal word and sentence task. Functional near infrared spectroscopy (fNIRS) and hemoglobin concentration amplitude values in both temporal lobes were utilized to assess cortical activation in response to visual and audiovisual speech. A series of individual correlation analyses were used to assess relations between participant demographics, auditory-only speech recognition scores, audiovisual benefit, and cortical activation data.

Results: Preliminary data suggests that the magnitude of visual cross-modal activation in the temporal lobe is variable for children with CIs and may be negatively related to speech-in-noise performance. Greater audiovisual benefit may be related to greater visual cross-modal activation in certain temporal lobe sub-regions as well as decreased activation in the left hemisphere to AV stimuli. Future data analyses will focus on differences in temporal lobe activation patterns and audiovisual benefit between children with typical hearing and those who use CIs.

Discussion: Preliminary data suggests that the magnitude of visual cross-modal activation in the temporal lobe is variable for children with CIs and may be negatively related to speech-in-noise performance. Greater audiovisual benefit may be related to greater visual cross-modal activation in certain temporal lobe sub-regions as well as decreased activation in the left hemisphere to AV stimuli. Future data analyses will focus on differences in temporal lobe activation patterns and audiovisual benefit between children with typical hearing and those who use CIs.

Keywords (if any): Cochlear Implants, fNIRS, Multisensory

Presenter Name: Jennifer Markfeld
Classification: Graduate
PI: Woynaroski, Tiffany

The Stability and Validity of Automated Indices of Vocal Development in Infants with Autistic and Non-autistic Siblings

Jennifer E. Markfeld, Jacob I. Feldman, Claire Daly, Pooja Santapuram, Sarah M. Bowman, Gabriella DiCarlo, Evan Suzman, Bahar Keçeli-Kaysili, Tiffany G. Woynaroski

Introduction: Prelinguistic vocalizations are the foundation of spoken language development and are predictive of autism features and language skills in both autistic children and infants who are known to be at increased likelihood for autism due to having an older autistic sibling (i.e., Sibs-autism). The Language ENvironment Analysis (LENA) device allows for automated analysis of variables purported to index vocal development and has been used in Sibs-autism to examine early vocalizations in this population. The stability of automated indices of vocal development, and their validity for predicting future language in Sibs-autism, however, is presently unknown. The present study sought to evaluate the extent to which automated indices of vocal development are stable and associated with future language in Sibs-autism.

Methods: This study drew on extant data from a longitudinal correlational study. Infant participants were 20 Sibs-autism and 20 infants with older, non-autistic siblings (Sibs-NA). When infants were 12-18 months, families were given two LENA devices to record infant vocalizations in the home environment. Six automated LENA indices purported to tap aspects of child vocal complexity and frequency were derived. Nine months later, infant language abilities were assessed at a follow-up visit. Generalizability and Decision studies were used to evaluate the stability of the LENA indices. Regression models were run to test predictive validity of LENA indices on later child language scores.

Results: To our knowledge, this is the first study to examine the stability of LENA indices in Sibs-autism. Stability of the six automated indices of vocal development was higher in Sibs-autism when compared to Sibs-NA. Many of the automates indices of interest did not show strong associations with later language. True relations with language may be underestimated due to the low stability of some automated indices in our sample. These findings suggest that caution should be taken when using LENA to index vocal development due to limitations regarding stability and predictive validity. Future work should evaluate which aspects of early vocal development in Sibs-autism are most predictive of later language, and which measures purported to tap such constructs are most psychometrically sound.

Discussion: To our knowledge, this is the first study to examine the stability of LENA indices in Sibs-autism. Stability of the six automated indices of vocal development was higher in Sibs-autism when compared to Sibs-NA. Many of the automates indices of interest did not show strong associations with later language. True relations with language may be underestimated due to the low stability of some automated indices in our sample. These findings suggest that caution should be taken when using LENA to index vocal development due to limitations regarding stability and predictive validity. Future work should evaluate which aspects of early vocal development in Sibs-autism are most predictive of later language, and which measures purported to tap such constructs are most psychometrically sound.

Keywords (if any): vocal development, autism

Presenter Name: Amanda Martinez-Lincoln
Classification: Postdoc
PI: Cutting, Laurie

Individual differences in the neurocognitive demands of a symbolic vs. non-symbolic number comparison task

Amanda Martinez-Lincoln, Daniel R. Leopold, Darren J. Yeo, Boman Groff, B. Erik G. Willcutt, Marie T. Banich, Laurie E. Cutting, and Gavin R. Price

Introduction: Mathematical abilities require the integration of math-specific (e.g., numerical skills) and domain-general executive functions [EF; 1, 2, 3]. Neuroimaging studies consistently report intraparietal sulci activation during arithmetic tasks; however, activation of frontal brain regions associated with EF varies across studies [4, 5]. The discrepancies in the recruitment of EF during math tasks may be due, in part, to variations in individual differences and task demands. For instance, different task formats (i.e., symbolic, non-symbolic) may vary in EF demands [5]. Math ability is also associated with EF such that individuals with low math ability tend to exhibit poor EF [5-11], concurrently individuals using less automatic and efficient math strategies may rely more greatly on EF as a compensatory mechanism for poor math skills [3, 5, 12, 13] yielding a complex interaction between EF and math. To date, there is little known about the underlying mechanisms of EF that support math and the intricate relationship between EF and math ability [4]. The current study investigates how numerical magnitude processing in canonical math and EF brain regions is related to adolescents' behavioral math ability, processing speed, and EF.

Methods: Adolescents recruited from the Colorado Learning Disability Research Center (N = 156; Age Range = 10-16) completed a behavioral battery, including measures of math ability [14], processing speed [15], and EF [16]. Participants also completed task-based fMRI paradigms including a (1) symbolic and (2) non-symbolic number comparison task. For each task, we examined the ratio effect of individual neural activations in canonical math and EF regions, and subsequently analyzed how activity was related to concurrent behavioral measures of math ability, processing speed, and EF.

Results: Results suggest that math ability, processing speed, and EF have unique relationships to adolescents' number comparison ability for symbolic vs. non-symbolic formats. These findings could inform researchers and educators on nuanced instructional strategies that support the development of math abilities, particularly for those who struggle with learning.

Discussion: Results suggest that math ability, processing speed, and EF have unique relationships to adolescents' number comparison ability for symbolic vs. non-symbolic formats. These findings could inform researchers and educators on nuanced instructional strategies that support the development of math abilities, particularly for those who struggle with learning.

Keywords (if any): math, executive functions, fMRI

References (if any):

Geary, D.C., From infancy to adulthood: The development of numerical abilities. European Child & Adolescent Psychiatry, 2000. 9(2): p. S11
Wang, K., et al., Left posterior prefrontal regions support domain-general executive processes needed for both reading and math. Journal of Neuropsychology, 2020. 14(3): p. 467-495.
Cragg, L. and C. Gilmore, Skills underlying mathematics: The role of executive function in the development of mathematics proficiency. Trends in Neuroscience and Education, 2014. 3(2): p. 63-68.
Martinez-Lincoln, A., et al., Examination of common and unique brain regions for atypical reading and math: A meta-analysis. Cerebral Cortex, 2023.
Kucian, K. and M. von Aster, Developmental dyscalculia. European Journal of Pediatrics, 2015. 174(1): p. 1-13.
Passolunghi, M.C. and S. Lanfranchi, Domain-specific and domain-general precursors of mathematical achievement: A longitudinal study from kindergarten to first grade. British Journal of Educational Psychology, 2012. 82(1): p. 42-63.
Decker, S.L. and A.M. Roberts, Specific cognitive predictors of early math problem solving. Psychology in the Schools, 2015. 52(5): p. 477-488.
Bull, R. and G. Scerif, Executive functioning as a predictor of children's mathematics ability: inhibition, switching, and working memory. Dev Neuropsychol, 2001. 19(3): p. 273-93.
Peng, P. and D. Fuchs, A meta-analysis of working memory deficits in children with learning difficulties: Is there a difference between verbal domain and numerical domain? Journal of Learning Disabilities, 2014. 49(1): p. 3-20.
Rotzer, S., et al., Dysfunctional neural network of spatial working memory contributes to developmental dyscalculia. Neuropsychologia, 2009. 47(13): p. 2859-2865.
Wilkey, E.D., C. Pollack, and G.R. Price, Dyscalculia and typical math achievement Are associated with individual differences in number-specific executive function. Child Development, 2020. 91(2): p. 596-619.
McCaskey, U., et al., Longitudinal brain development of numerical skills in typically developing children and children with developmental dyscalculia. Frontiers in Human Neuroscience, 2018. 11(629).
McCaskey, U., et al., Adolescents with developmental dyscalculia do not have a generalized magnitude deficit - processing of discrete and continuous magnitudes. Frontiers in Human Neuroscience, 2017. 11(102).
Woodcock, R.W., K.S. McGrew, and N. Mather, Woodcock-Johnson III NU Tests of Cognitive Abilities. 2001, 2007, Rolling Meadows, IL: Riverside Publishing.
Wechsler, D., Wechsler Intelligence Scale for Children (3rd ed.). (WISC-III): Manual. 1991, San Antonio, TX: The Psychological Corporation.
Gioia, G.A., et al., Behavior Rating Inventory of Executive Function®, Second Edition (BRIEF®2). 2015, Lutz, FL: PAR Inc.

Presenter Name: Ryan Millager
Classification: Graduate
PI: Jones, Robin M.

Stuttering Research in 2020: A Systematic Review of Global Representation and Reporting Practices in English-Language Journals

Ryan A. Millager, Talia Liu, Dillon Pruett, & Robin M. Jones

Introduction: There is a need to examine the demographic representation of participants included in peer-reviewed stuttering research. Millager and colleagues (under review) recently conducted a systematic review of representation in studies with US-based participants in American Speech-Language-Hearing Association journals and found inconsistent demographic reporting practices and inadequate racial/ethnic diversity. Fluency disorders represented just 6.1% of the k = 407 studies reviewed in Millager et al. (under review). To capture a more global and in-depth snapshot of representation and reporting practices in stuttering research, we aim to extract data from a broader corpus of articles, to answer the following research questions: (1) what is the worldwide geographic distribution of stuttering research participants, (2) what are demographic reporting practices (i.e., gender, race/ethnicity, socioeconomic status), and (3) how have demographics been further considered in research?

Methods: Using an adapted and manualized coding system (Millager et al., under review), we extracted data on study geography, participant characteristics, reporting practices, and further consideration of demographic data in analyses and discussions for all empirical studies with participants who stutter or clutter published in the year 2020 by English-language peer-reviewed journals. Primary coding of the entire corpus was completed by the first author, with secondary reliability coding completed by the second and third authors for 20% of the corpus.

Results: Consistent with broader communication sciences and disorders research in the United States (Millager et al., under review), research in stuttering worldwide frequently omits key demographic data that may be relevant to understanding the impact and development of stuttering, although cross-national comparisons may not be valid with respect to differing constructions of ethnicity between countries. Further interpretation and follow-up analyses are in progress, and results are expected to reveal potential considerations for researchers and other stakeholders to pursue towards more inclusive and accountable research in the future.

Discussion: Consistent with broader communication sciences and disorders research in the United States (Millager et al., under review), research in stuttering worldwide frequently omits key demographic data that may be relevant to understanding the impact and development of stuttering, although cross-national comparisons may not be valid with respect to differing constructions of ethnicity between countries. Further interpretation and follow-up analyses are in progress, and results are expected to reveal potential considerations for researchers and other stakeholders to pursue towards more inclusive and accountable research in the future.

Keywords (if any): stuttering, diversity, systematic review

References (if any):

Millager, R.A., Feldman, J.I., Williams, Z.J., Shibata, K., Martinez-Torres, K., Bryan, K., Pruett, D., Mitchell, J., Markfeld, J., Merritt, B., Daniels, D., Jones, R.M., & Woynaroski, T. (under review). The diversity of research participant race, ethnicity, and gender in communication sciences and disorders: A review of recent ASHA publications.

Presenter Name: Carly Moser
Classification: Postdoc
PI: Taylor, Julie Lounds

Correlates of Self-Reported Life Satisfaction in Autistic Youth with and without Intellectual Disability

Carly Moser, Leann DaWalt, Meghan Burke, Julie Lounds Taylor

Introduction: The identification of meaningful outcomes for autistic people is necessary to optimize supports that align with the population's needs. While outcomes for those with autism have historically focused on objective indicators of well-being (e.g., social participation, employment), a greater emphasis on subjective measures of well-being, including life satisfaction, is a high priority for the autistic community1. Research examining factors that promote life satisfaction is limited, and existing studies do not include the perspective of autistic people with intellectual disability (ID). Therefore, the present study aims to expand current research by identifying correlates of self-reported life satisfaction in autistic youth with and without ID. Specifically, the study examined associations between life satisfaction and youth characteristics (mental health, self-determination), parent characteristics (mental health), and objective indicators of well-being (social participation, unmet service needs).

Methods: Participants were 134 autistic youth (M = 19 years) enrolled in a larger randomized controlled trial. Data for this study was collected at baseline. Life satisfaction was measured using the Satisfaction with Life Scale2, a five-item self-report survey. Youth mental health was measured using the DSM-oriented anxiety and depression scales of the Child Behavior Checklist3/Adult Behavior Checklist4, a parent-report survey. Youth self-determination was measured via the Self Determination Inventory System5, a self-report survey. Parent mental health was measured using the Depression Anxiety Scales questionnaire6. Social participation and unmet service needs were measured using questions from the National Longitudinal Transition Study-2. The frequency of the youth's current social activities and the number of unmet service needs were used in the analysis.

Results: In the current study, life satisfaction in autistic youth without ID was associated with personal characteristics, whereas life satisfaction was associated with parent characteristics and objective indicators of well-being for autistic youth with ID. Our findings demonstrate unique differences in factors related to positive outcomes for youth with and without ID and emphasize the need to consider the heterogeneity across individuals on the autism spectrum when assessing how to best support positive outcomes in this population.

Discussion: In the current study, life satisfaction in autistic youth without ID was associated with personal characteristics, whereas life satisfaction was associated with parent characteristics and objective indicators of well-being for autistic youth with ID. Our findings demonstrate unique differences in factors related to positive outcomes for youth with and without ID and emphasize the need to consider the heterogeneity across individuals on the autism spectrum when assessing how to best support positive outcomes in this population.

Keywords (if any): Transition Age, Outcomes, Autism

References (if any):

Benevides, T. W., Shore, S. M., Palmer, K., Duncan, P., Plank, A., Andresen, M. L., ... & Coughlin, S. S. (2020). Listening to the autistic voice: Mental health priorities to guide research and practice in autism from a stakeholder-driven project. Autism, 24(4), 822-833.
Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. Journal of personality assessment, 49(1), 71-75.
Achenbach, T. M., McConaughy, S. H., Ivanova, M. Y., & Rescorla, L. A. (2017). Manual for the ASEBA Brief problem monitor for ages 6-18 (BPM/6-18). Burlington: University of Vermont Research Center for Children, Youth, and Families.
Achenbach, T.M., & Rescorla, L.A. (2003). Manual for the ASEBA Adult Forms & Profiles. Burlington, VT: University of Vermont, Research Center for Children, Youth, and Families.
Shogren, K. A., Wehmeyer, M. L., & Palmer, S. B. (2017). Causal agency theory. Development of self-determination through the life-course, 55-67.
Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behaviour research and therapy, 33(3), 335-343.

Presenter Name: Sophia Mueller
Classification: Undergraduate
PI: Taylor, Julie Lounds

Job characteristics and their associations with mental health in autistic adults

Sophia Mueller, Virginia Sullivan, M.A., Natalie Libster, Ph.D., Leann DaWalt, Ph.D., Julie Lounds Taylor, Ph.D.

Introduction: It is well-established that autistic adults face significant difficulties with employment (Taylor et al., 2015) and are more likely to experience depression and lower quality of life (QoL) relative to neurotypical individuals (Hudson et al., 2019; Hollocks et al., 2019) - however, little is known about aspects of jobs that increase risk for or protect against negative mental health outcomes. The aim of the current study was to explore which objective employment characteristics (i.e., context and requirements of a job) and subjective characteristics (i.e., how an employee feels about the job) are associated with depressive symptoms and QoL in a sample of autistic working adults.

Methods: This study analyzed baseline data from a longitudinal study examining employment stability in autistic adults. Participants included 110 working autistic adults (66 male) between the ages of 18-35 (M=26.19) and 92 informants (65 mothers) who participated with their young adult. Adults and informants described adults' workplace roles and responsibilities using the Vocational Index (Taylor & Seltzer, 2012). Using Occupational Network (O*NET) and the Dictionary of Occupational Titles (DOT) criteria, jobs were scored on the following objective characteristics: education required, social perceptiveness, and job complexity. Adults were coded as "overeducated" if their education level was higher than their job's required education. Adults also completed subjective measures of workplace environment (psychological safety, diversity climate, and leader-member exchange; Vogus et al., 2014), job satisfaction (Job Descriptive Index; Brodke et al., 2009), depressive symptoms (Beck Depression Inventory-II; Beck et al., 1996), and quality of life (WHOQoL-BREF, 1998). Correlations and independent samples t-tests were implemented.

Results: Subjective employment measures were associated with depressive symptoms and QoL in autistic adults. Thus, how autistic adults feel about their jobs may play an important role in mental health, while objective job characteristics related to mental health in the general population might be less impactful. Discussion will focus on future research directions and how findings can inform vocational supports and resources for autistic adults.

Discussion: Subjective employment measures were associated with depressive symptoms and QoL in autistic adults. Thus, how autistic adults feel about their jobs may play an important role in mental health, while objective job characteristics related to mental health in the general population might be less impactful. Discussion will focus on future research directions and how findings can inform vocational supports and resources for autistic adults.

Keywords (if any): autism, mental health, employment

References (if any):

Beck A. T., Steer R. A., Brown G. K. (1996). Manual for the Beck Depression Inventory-II. San Antonio, TX: Psychological Corporation.
Brodke, M., Sliter, M., Balzer, W., Gillespie, J., Gillespie, M., Gopalkrishnan, P., et al. (2009). The job descriptive index and job in general: 2009 revision quick reference guide. Bowling Green, OH: Bowling Green State University.
Hollocks, M. J., Lerh, J. W., Magiati, I., Meiser-Stedman, R., & Brugha, T. S. (2019). Anxiety and depression in adults with autism spectrum disorder: A systematic review and meta-analysis. Psychological Medicine, 49(4), 559-572. DOI: 10.1017/S0033291718002283
Hudson, C. C., Hall, L., & Harkness, K. L. (2019). Prevalence of depressive disorders in individuals with Autism Spectrum Disorder: A meta-analysis. Journal of Abnormal Child Psychology, 47(1), 165-175. DOI: 10.1007/s10802-018-0402-1
National Center for O*NET Development. O*NET OnLine. https://www.onetonline.org
Schwartzman, J. M., & Corbett, B. A. (2022). Depression and employment outcomes in autistic adults: A systematic review. Review Journal of Autism and Developmental Disorders. https://doi.org/10.1007/s40489-022-00331-9
Taylor, J. L., Henninger, N. A., & Mailick, M. R. (2015). Longitudinal patterns of employment and postsecondary education for adults with autism and average-range IQ. Autism, 19(7), 785-793. DOI: 10.1177/1362361315585643
Taylor, J. L., & Seltzer, M. M. (2012). Developing a vocational index for adults with autism spectrum disorders. Journal of Autism and Developmental Disorders, 42(12), 2669-2679. DOI: 10.1007/s10803-012-1524-
The WHOQOL Group (1998). Development of the World Health Organization WHOQOL-BREF quality of life assessment. Psychological Medicine, 28(3), 551-558. doi: 10.1017/s0033291798006667.
United States Employment Service. (1991). Dictionary of Occupational Titles. Washington, D.C.: The administration Vogus, T. J., Cooil, B., Sitterding, M., & Everett, L. Q. (2014). Safety organizing, emotional exhaustion, and turnover in hospital nursing units. Medical Care, 52(10), 870-876. http://www.jstor.org/stable/2446680

Presenter Name: Ambar Muñoz Lavanderos
Classification: Research staff
PI: Warren, Zachary

Piloting a novel telemedicine tool to screen for autism in preschool-aged children

Ambar Muñoz Lavanderos, Alison Vehorn, Liliana Wagner, Amy S. Weitlauf, Laura Corona, and Zachary E. Warren

Introduction: Telemedicine has become a notable way to conduct autism assessments to increase accessibility and decrease long waitlists time. In particular, the Tele-ASD-Peds (TAP) is a caregiver-mediated tool used in telemedicine evaluations for children under 36 months to elicit autism symptoms.1 As a result of its feasibility, we adapted the TAP to create the TAP- Preschool (TAP-P), a novel telemedicine tool used to evaluate preschool aged children. To better understand the feasibility of the TAP-P, we examined the screening tool for diagnostic concordance rate and clinician certainty.

Methods: In this study, we tested out the TAP-P on a novel sample of 45 participants aged 36 to 72 months. Each child participated in a telehealth visit and in an in person diagnostic visit. The clinician from the telehealth visit made a diagnostic impression, but provided no diagnostic feedback to the family, while the clinician from the in-person appointment provided an official diagnosis. All telehealth and clinical data were logged onto a REDCap database. Different clinical measures were collected, including standardized cognitive and parent interview measures, as well as parent and clinician feedback. We then examined diagnostic concordance rate and clinician certainty between each telehealth and in person appointments.

Results: This study demonstrated insight into clinician confidence when evaluating both verbal and non/minimally verbal pre-school aged children over telehealth and in clinic. Overall, clinicians felt more certain of diagnostic impressions for non/minimally verbal children and during in person assessments. Even though certainty for older and verbal children was lower, concordance rate for verbal children was not too far behind the concordance rate of non/minimally verbal children. Future research should continue to explore the TAP-P in older children and more heterogenous presentations of autism.

Discussion: This study demonstrated insight into clinician confidence when evaluating both verbal and non/minimally verbal pre-school aged children over telehealth and in clinic. Overall, clinicians felt more certain of diagnostic impressions for non/minimally verbal children and during in person assessments. Even though certainty for older and verbal children was lower, concordance rate for verbal children was not too far behind the concordance rate of non/minimally verbal children. Future research should continue to explore the TAP-P in older children and more heterogenous presentations of autism.

Keywords (if any): autism, telemedicine, preschool

References (if any):

Wagner L, Corona LL, Weitlauf AS, Marsh KL, Berman AF, Broderick NA, Francis S, Hine J, Nicholson A, Stone C, Warren Z. Use of the TELE-ASD-PEDS for Autism Evaluations in Response to COVID-19: Preliminary Outcomes and Clinician Acceptability. J Autism Dev Disord. 2021 Sep;51(9):3063-3072. doi: 10.1007/s10803-020-04767-y. Epub 2020 Oct 30. PMID: 33125622; PMCID: PMC7596626.

Presenter Name: Tin Nguyen
Classification: Postdoc
PI: Cutting, Laurie

Correlations between functional brain connectivity and monitoring processes in reading performance among second-grade students

Tin Q. Nguyen, Sage E. Pickren, Laurie E. Cutting

Introduction: Skilled reading calls on monitoring processes to sustain efficiency in recognizing individual words and drawing ideas from text. Some students detect and self-correct word-recognition errors while reading aloud. Text understanding taps students' ability to track which ideas are important to the overall meaning. Past work has mapped activity in the brain language network that underlies children's reading performance. Our study asked whether monitoring processes would also involve the brain language network and/or unique brain systems.

Methods: The research question was evaluated in a sample of 68 second-grade students, who were underwent resting-state functional MRI scan and were administered an out-of-scanner passage reading task. Resting-state functional MRI data were analyzed using seeds from the Yeo's seven-network atlas. Performance on out-of-scanner passages was used to capture students' probabilities of self-correcting word-recognition errors and of recalling important ideas. Correlation analyses were conducted to analyze the associations between functional brain network connectivity values and passage reading indices.

Results: Results suggest that monitoring processes at the word and comprehension levels in reading performance are associated with not only the language network, but also executive and salience networks. These findings could provide insights for educational practice and strategies that aim at supporting children's' reading comprehension outcomes.

Discussion: Results suggest that monitoring processes at the word and comprehension levels in reading performance are associated with not only the language network, but also executive and salience networks. These findings could provide insights for educational practice and strategies that aim at supporting children's' reading comprehension outcomes.

Keywords (if any): Reading, Brain connectivity, Monitoring

Presenter Name: Harrison Parent
Classification: Graduate
PI: Niswender, Colleen

The Role of Metabotropic Glutamate Receptor 7 in Neurofibromatosis Type I

Harrison Parent1, Rocco G. Gogliotti1,2, Kelly Weiss1,2, Anne Taylor1,2, Nicole M. Fisher1,2, Branden J. Stansley1,2, Robert R. Lavieri3, Jana K. Shirey-Rice3, Jill M. Pulley3, Colleen M. Niswender1,2,3

Introduction: Metabotropic glutamate receptor 7 (mGlu7) is a member of the group III metabotropic glutamate (mGlu) receptor family, and is the most highly conserved and widely expressed mGlu receptor. mGlu7 has been previously associated with numerous neurodevelopmental, neuropsychiatric, and learning disorders including Rett syndrome, schizophrenia, and bipolar disorder. A previous Phenome-wide association study (PheWAS) conducted through the Vanderbilt Institute for Clinical and Translational Research (VICTR) generated a novel association between single nucleotide polymorphisms (SNPs) in the GRM7 gene and the phenotype of neurofibromatosis. Upon further data mining, it was uncovered that most of these identified records were associated with a diagnosis of Neurofibromatosis type I (NF1). NF1 is the most common genetic neurodevelopmental disorder in the world, with an incidence of 1 in 3,000 live births1. NF1 is typically identified by the presence of benign neurofibromas, as well as various pigmentation abnormalities. However, ~60% of NF1 patients also present with intellectual disabilities which do not correlate with the severity of other symptoms2. Based on known associations of mGlu7 with cognitive and learning deficits and the novel association of mGlu7 with NF1, we hypothesize that mGlu7 acts as a modifier for learning challenges in the NF1 population. Preliminary data have shown that mGlu7 potentiation in an NF1 mouse model improves learning as assessed using a conditioned fear response. This evidence supports the association determined in the PheWAS and supports therapeutic potential of mGlu7 in the treatment of learning deficits in NF1 patients.

Methods: The association of GRM7 SNPs with the phenotype of neurofibromatosis was determined through a PheWAS study conducted by VICTR. Following this identification, contextual fear responses were measured in mice of WT, Nf123a+/-, and Nf123a-/- mice in response to vehicle or 30 mg/kg treatment with VU0422288. An elevated zero maze test was subsequently conducted to rule out the role of anxiety modulation as a modifier in conditioned fear responses. Future studies will be conducted in mice to assess other domains of learning, memory, and attention. In vitro studies are also currently underway to elucidate the molecular mechanism driving mGlu7-mediated alleviation of NF1-associted cognitive impairments.

Results: These data suggest a role for mGlu7 in fear learning in Nf1 mutant mice. However, the mechanism by which this treatment exerts its effect is unclear. While these preliminary results are promising, further experiments must be conducted to understand the molecular mechanisms driving mGlu7-mediated learning reinforcement.

Discussion: These data suggest a role for mGlu7 in fear learning in Nf1 mutant mice. However, the mechanism by which this treatment exerts its effect is unclear. While these preliminary results are promising, further experiments must be conducted to understand the molecular mechanisms driving mGlu7-mediated learning reinforcement.

Keywords (if any): Neurofibromatosis, Cognition, GPCRs

References (if any):

Gutmann, D. H., Parada, L. F., Silva, A. J. & Ratner, N. Neurofibromatosis Type 1: Modeling CNS Dysfunction. J. Neurosci. 32, 14087-14093 (2012).

Diggs-Andrews, K. A. & Gutmann, D. H. Modeling cognitive dysfunction in neurofibromatosis-1. Trends in Neurosciences 36, 237-247 (2013).

Presenter Name: Clara Plutzer
Classification: Research staff
PI: Booth, James

Investigating the role of dIFG and vIFG during phonological and orthographic processing: an effective connectivity study of fMRI in children

Clara Plutzer, Neelima Wagley, Rachael Rice, Anna Banaszkiewicz, James R. Booth

Introduction: Reading development is supported by the functional connections between several brain regions including the left ventral occipitotemporal (vOT) cortex, temporoparietal (TP) cortex, and the inferior frontal gyrus (IFG). Particularly, the left IFG is thought to be influential in managing cognitive control of phonological and orthographic representations - key processes that underly reading. However, the causal relation between the IFG and other brain regions that support reading development remain unclear. Dynamic causal modeling (DCM) is a method used for estimating directional coupling among brain regions and how it is influenced by the experimental context. Using DCM, we investigate whether IFG modulation with posterior regions of the reading network is driven by the dorsal (dIFG) as compared to the ventral (vIFG) inferior frontal gyrus. We also examine whether these effects are stronger for trials with conflicting compared to non-conflicting orthographic and phonological information. This study was preregistered on OSF (osf.io/eh7t9).

Methods: Forty-two participants (10-17 years old, M=12.48) completed a visual word-rhyming task examining phonological and orthographic processing during fMRI. In this task, participants indicated whether two sequentially presented written English words rhyme. Word pairs were operationalized into two conditions. The conflicting conditions are trials in which the orthography and phonology don't match; for example, words with similar orthography but different phonology (e.g., stood-flood) or different orthography but similar phonology (e.g., wheel-deal). The non-conflicting conditions are trials in which both orthography and phonology match (e.g., thread-spread) or don't match (e.g., tough-dull).

Results: Investigating how the dIFG and vIFG modulate activation of the posterior regions will help us better understand how the reading network interacts during different cognitive demands. The results can inform our understanding of the neural mechanisms of word reading, specifically the role of IFG in modulating phonological and orthographical processes.

Discussion: Investigating how the dIFG and vIFG modulate activation of the posterior regions will help us better understand how the reading network interacts during different cognitive demands. The results can inform our understanding of the neural mechanisms of word reading, specifically the role of IFG in modulating phonological and orthographical processes.

Keywords (if any): reading development, phonological processing, neuroimaging

Presenter Name: Grace Pulliam
Classification: Graduate
PI: Woynaroski, Tiffany

Language Development is Associated with Sensory Responsiveness in Infants at Risk for Autism

Grace Pulliam, Kacie Dunham-Carr, Jacob I. Feldman, Sweeya Raj, Ashley E. Augustine, Sarah M. Bowman, Claire Daly, Varsha Garla, Alexandra J. Golden, Pooja Santapuarm, Evan Suzman, Carissa J. Cascio, Katie L. Williams, Anne Kirby, Bahar Keçeli-Kaysılı,

Introduction: It has been proposed that differences in sensory responsiveness (i.e., patterns of responding to sensory stimuli), particularly in the earliest stages of development, may produce "cascading effects" on communication and language development in children with autism spectrum disorder (ASD). This theory has been challenging to test, in part because we cannot always reliably diagnose ASD in the earliest stages of development (i.e., in infancy). As a potential solution to this problem, the Sensory Project in Infant Siblings (Project SPIS) is prospectively following infants known to be at high risk for ASD and other language and communication impairments based on their status as younger siblings of children with ASD (Sibs-ASD) to evaluate (a) when differences in sensory responsiveness emerge and (b) the extent to which they may be useful for predicting future communication and language outcomes. This NIDCD-funded longitudinal correlational study is ongoing. Here, in a test of preliminary results, we evaluate (a) whether sensory responsiveness differs in infant Sibs-ASD relative to infant siblings of typically developing children (Sibs-TD) at entry to Project SPIS, (b) whether early sensory responsiveness is associated with concurrent (entry-level) communication and language skill, and (c) whether concurrent associations between sensory responsiveness and communication/language skill vary according to risk group.

Methods: Preliminary analyses were conducted on 28 infants between the ages of 11 and 18 months (11 Sibs-ASD, 17 Sibs-TD; anticipated n = 40). Patterns of sensory responsiveness were measured with two measures - the Sensory Experiences Questionnaire (SEQ) and the Sensory Processing Assessment (SPA). At this same time point, parents reported on their children's communication and language skill via the Vineland Adaptive Behavior Scales (VABS) and the MacArthur-Bates Communicative Development Inventories: Words and Gestures (MCDI) checklist.

Results: Preliminary results suggest that atypical sensory responsiveness covaries with poorer concurrent language and communication in infants, lending increased empirical support to the cascading effects theory. Longitudinal data will allow us to evaluate the extent to which early sensory responsiveness is useful for predicting future communication. If our hypotheses are born out in final analyses, findings from this project may facilitate early identification, and point towards sensory responsiveness as a potentially important target of early "preventative" interventions for infants at heightened risk for ASD.

Discussion: Preliminary results suggest that atypical sensory responsiveness covaries with poorer concurrent language and communication in infants, lending increased empirical support to the cascading effects theory. Longitudinal data will allow us to evaluate the extent to which early sensory responsiveness is useful for predicting future communication. If our hypotheses are born out in final analyses, findings from this project may facilitate early identification, and point towards sensory responsiveness as a potentially important target of early "preventative" interventions for infants at heightened risk for ASD.

Keywords (if any): autism, language development, sensory responsiveness

References (if any):

Baranek, G. T. (1999). Sensory processing assessment for young children (SPA). Unpublished manuscript. University of North Carolina at Chapel Hill.
Baranek, G. T., David, F. J., Poe, M. D., Stone, W. L., & Watson, L. R. (2006). Sensory Experiences Questionnaire: Discriminating sensory features in young children with autism, developmental delays, and typical development. Journal of Child Psychology and Psychiatry, 47, 591-601. doi:10.1111/j.1469-7610.2005.01546.x
Baranek, G. T., Woynaroski, T. G., Nowell, S., Turner Brown, L., DuBay, M., Crais, E., & Watson, L. R. (2018). Cascading effects of attention disengagement and sensory seeking on social symptoms in a community sample of infants at-risk for a future diagnosis of autism spectrum disorder. Developmental Cognitive Neuroscience, 29, 30-40. doi:10.1016/j.dcn.2017.08.006
Cascio, C. J., Woynaroski, T., Baranek, G. T., & Wallace, M. T. (2016). Toward an interdisciplinary approach to understanding sensory function in autism spectrum disorder. Autism Research, 9, 920-925. doi: 10.1002/aur.1612.

Presenter Name: Tabitha Reed
Classification: Graduate
PI: McDaniel, Jena

Mind the Gap: Measuring Language Growth Rate for ASL and Spoken English in DHH Children

Tabitha G. Reed, Jena McDaniel, Nicole Chow, Angie Walker

Introduction: A common language development goal for deaf and hard of hearing (DHH) children is one year's progress within one year's time. However, for many DHH children the gap between their language skills and those of their peers with typical hearing remains open and may widen for ASL and spoken English[1-5].

We address two research questions to analyze the degree to which DHH children are making progress towards achieving age-expected language milestones.
RQ1: What proportion of DHH children achieved language milestones expected for their age?
RQ2: What proportion of DHH children exhibited a rate of progress across approximately one year that results in (a) narrowing and (b) widening of the gap between their language skills and age expectations?

Methods: Using a longitudinal natural history study design, we evaluated the ASL and English skills of 56 DHH children with varying hearing levels, use of hearing technology, and educational settings from the Kansas Language Assessment Program-DHH. Twenty-eight participants use ASL and 44 use spoken English. Nine participants use, and were assessed in, both languages. The ASL/English Language Milestones measure uses direct observation, standardized assessment results, and parent/teacher report to assess receptive, expressive, and social communication milestones in ASL and spoken English from birth through age 8. Participants' mastered language level was calculated at two time points averaging 11.1 months apart (SD = 3.4 months) for ASL and 12.5 months apart (SD = 5.2) for spoken English. ASL and English growth rates were (separately) calculated by dividing the change in mastered language age level in months by the number of months between administrations.

Results: The majority of participants are not meeting milestones for either language and exhibiting a widening gap between their language skills and age expectations despite gains in skills. These results demonstrate that the ASL/English Language Milestones measure can capture a variety of language development patterns.

Discussion: The majority of participants are not meeting milestones for either language and exhibiting a widening gap between their language skills and age expectations despite gains in skills. These results demonstrate that the ASL/English Language Milestones measure can capture a variety of language development patterns.

Keywords (if any): language, deaf and hard of hearing, children

References (if any):

Antia, S. D., Jones, P. B., Reed, S., & Kreimeyer, K. H. (2009). Academic status and progress of deaf and hard-of-hearing students in general education classrooms. Journal of Deaf Studies and Deaf Education, 14(3), 293-311. https://doi.org/10.1093/deafed/enp009

Geers, A. E., Moog, J. S., Biedenstein, J., Brenner, C., & Hayes, H. (2009). Spoken language scores of children using cochlear implants compared to hearing age-mates at school entry. Journal of Deaf Studies and Deaf Education, 14(3), 371-385. https://doi.org/10.1093/deafed/enn046

Lund, E. (2016). Vocabulary knowledge of children with cochlear implants: A meta-analysis. Journal of Deaf Studies and Deaf Education, 21(2), 107-121. https://doi.org/10.1093/deafed/env060

Moeller, M. P. McCleary, E., Putman, C., Tyler-Krings, A., Hoover, B., & Stelmachowicz, P. (2010). Longitudinal development of phonology and morphology in children with late-identified mild-moderate sensorineural hearing loss. Ear and Hearing, 31(5), 625-635. https://doi.org/10.1097/AUD.0b013e3181df5cc2

Tomblin, J. B., Oleson, J., Ambrose, S. E., Walker, E. A., McCreery, R. W., & Moeller, M. P. (2020). Aided hearing moderates the academic outcomes of children with mild to severe hearing loss. Ear and Hearing, 41(4), 775-789. https://doi.org/10.1097/AUD.0000000000000823

Presenter Name: Katrina Rbeiz
Classification: Graduate
PI: Park, Sohee

An Automated Linguistic Analysis of First-Person Accounts of Psychosis

Katrina Rbeiz, HyeonSeung Lee, Tatiana Baxter, Michael Sangimino, Pietra Bruni, Anne Felsenheimer, Katie Babbitt, Olivia Jelsma, Mincheol Kim, Minyeong Li, Adi Peres, James Yang, Sohee Park

Introduction: Language and thought disorder are defining features of schizophrenia but self-initiated personal narratives are rarely analyzed to extract clinically meaningful variables. Moreover, previous studies of first-person accounts (FPAs) did not tend to compare the results from individuals with schizophrenia (SZ) with narratives generated by community controls (CO). We aimed to compare FPAs of SZ published in an academic journal with narratives generated by CO, using an automated linguistic analysis tool.

Methods: Two groups of independent raters evaluated and conducted a qualitative review of each of the 269 narratives from Schizophrenia Bulletin published between 1979 and 2022. They screened non-psychosis related narratives, categorized, and counted self-reported symptoms (e.g., disorganized thought) and behaviors (e.g., loneliness). There were 187 FPAs of SZ. 37 relative narratives were not included in this study. The Open American National Corpus (OANC, https://anc.org) was used to obtain data from CO: 187 out of 5979 narratives were randomly selected with a bootstrapping approach. The Linguistic Inquiry and Word Count program (LIWC; Pennebaker et al, 2015) was used to quantify the narratives. We focused on the frequency of pronoun use and the following relevant variables: formal and logical thinking patterns (Analytic); social confidence or leadership (Clout); degree of self-monitoring (Authenticity); and positive tone (Emotional Tone).

Results: Using an automated linguistic tool, we extracted clinically meaningful variables from published narratives. Although it is difficult to interpret the differences in pronoun use between SZ and CO due to the varied nature of these narratives, within the SZ group, loneliness and disorganized symptoms played a role in pronoun use. Loneliness seemed to highlight "I" in SZ. Similarly, disorganized symptoms were associated with increased personal pronoun use. Lower 'clout' in SZ reflects reduced social status and confidence, suggestive of social defeat; many FPAs describe ongoing social challenges. Interestingly, the authenticity score was increased in SZ, perhaps because they tend to write without self-censorship and filtering. Lower analytic score in SZ may be indicative of cognitive alterations that impact formal or logical thinking abilities. Importantly, loneliness and disorganized symptoms were associated with reduced clout and increased authenticity, reflecting the tenuous social status of the lonelier and more symptomatic SZ who reveal their inner experiences without filters, but we are unable to discern the direction of effect. To summarize, this study showed the utility and feasibility of applying automated linguistic tools to extract clinically relevant information from a large corpus of written narratives. However, further research is needed to validate this approach with established assessments of language and thought disorder in schizophrenia spectrum conditions.

Discussion: Using an automated linguistic tool, we extracted clinically meaningful variables from published narratives. Although it is difficult to interpret the differences in pronoun use between SZ and CO due to the varied nature of these narratives, within the SZ group, loneliness and disorganized symptoms played a role in pronoun use. Loneliness seemed to highlight "I" in SZ. Similarly, disorganized symptoms were associated with increased personal pronoun use. Lower 'clout' in SZ reflects reduced social status and confidence, suggestive of social defeat; many FPAs describe ongoing social challenges. Interestingly, the authenticity score was increased in SZ, perhaps because they tend to write without self-censorship and filtering. Lower analytic score in SZ may be indicative of cognitive alterations that impact formal or logical thinking abilities. Importantly, loneliness and disorganized symptoms were associated with reduced clout and increased authenticity, reflecting the tenuous social status of the lonelier and more symptomatic SZ who reveal their inner experiences without filters, but we are unable to discern the direction of effect. To summarize, this study showed the utility and feasibility of applying automated linguistic tools to extract clinically relevant information from a large corpus of written narratives. However, further research is needed to validate this approach with established assessments of language and thought disorder in schizophrenia spectrum conditions.

Keywords (if any): schizophrenia, loneliness, narratives

References (if any):

Pennebaker, J.W., Boyd, R.L. ,Jordan,K.,& Blackburn, K.(2015).The development and psychometric properties of LIWC2015 .Austin, TX: University of Texas at Austin.DOI:10.15781/T29G6Z

Presenter Name: Gabrielle Reimann
Classification: Graduate
PI: Kaczkurkin, Antonia

Using Machine Learning to Derive Neurobiological Subtypes of General Psychopathology in Late Childhood

Gabrielle E. Reimann, Randolph M. Dupont, Aris Sotiras, Hee Jung Jeong, E. Leighton Durham, Camille Archer, Tyler M. Moore, Benjamin B. Lahey, & Antonia N. Kaczkurkin

Introduction: Traditional mental health diagnoses rely on the subjective observation of psychological symptoms. This approach oversimplifies symptom presentations and does not adequately map onto neurobiological features. As an alternative to traditional research designs, the present study used a semi-supervised machine learning technique, heterogeneity through discriminative analysis (HYDRA), to identify neurobiologically driven subtypes of general psychopathology in late childhood (n = 6,018).

Methods: HYDRA simultaneously clustered and classified children with high endorsements of general psychopathology using neurobiological features, deriving subtypes based on maximal anatomical distinctions from controls. We examined cortical thickness, cortical and subcortical gray matter volume, hierarchically-defined psychopathology scores, and cognitive task performance in children ages 9-10 years from the Adolescent Brain Cognitive DevelopmentSM (ABCD®) Study at baseline and across two years.

Results: Taken together, our data-driven approach uncovered patterns of neural heterogeneity that are not apparent when using traditional categorical diagnoses. Subtypes diverged on structural metrics, cognition, and psychopathology symptoms, which may indicate important neural markers of these symptoms.

Discussion: Taken together, our data-driven approach uncovered patterns of neural heterogeneity that are not apparent when using traditional categorical diagnoses. Subtypes diverged on structural metrics, cognition, and psychopathology symptoms, which may indicate important neural markers of these symptoms.

Keywords (if any): machine learning subtypes, internalizing symptoms, ADHD

Presenter Name: Rachael Rice
Classification: Research staff
PI: Booth, James

The role of speech reading in skilled visual word processing in hearing children

Rachael Rice, Anna Banaszkiewicz, Neelima Wagley, Clara Plutzer, James R. Booth

Introduction: The development of phonological representations of spoken words is dependent upon auditory speech information and visual information from speech gestures. Speech reading (SR), watching movements of a speaker's mouth and face, provides visual speech information that support phonological representations and reading development. Previous research suggests that phonological awareness mediates the relations between speech reading and word reading. Neuroimaging studies using functional magnetic resonance imaging (fMRI) show that the brain region associated with phonological aspects of speech perception, including SR, is the left superior temporal sulcus (STS). In this preregistered study (https://osf.io/8chuk), we evaluated the role of the left STS in children during phonological processing of visual words using fMRI. We hypothesized that the STS, as localized using an independent SR localizer, would be active during a visual word-rhyming phonology task.

Methods: Thirty-eight participants (10-17 years-old, M=12.7) completed a SR localizer to determine the region of interest (ROI) and a phonology task, during fMRI. In the SR localizer, participants were presented with two sequential silent videos of a person saying a single monosyllabic word and indicated whether the word pairs were similar. In the phonology task, participants indicated whether two sequentially presented written English words rhyme. Both tasks also contained control conditions in which participants indicated if two fixation crosses matched in color. Additionally, phonological awareness was assessed using the Elision subtest of the Comprehensive Test of Phonological Processing (CTOPP-2). The ROI based on the SR localizer was created in two steps: 1) the anatomical mask of the left STS was constructed using the automated anatomic labeling atlas, 2) a voxel-wise regression analysis was computed within the STS anatomical mask to evaluate a correlation between brain activation for the SR localizer (experimental>fixation) and the Elision subtest scaled scores. Top 1000 voxels showing the highest correlation were selected as an STS ROI for further analyses. Finally, a one-sample t-test for the phonological task was computed within the ROI.

Results: In line with our hypothesis, brain activation was present in the left STS during the phonology task. This suggests that the neural correlates within the STS engaged in phonological processing during speech reading was also activated for phonology during word reading. This expands our knowledge of the role that STS plays in phonological representations. Better understanding of the relation between speech reading, phonological awareness, and word reading may form a basis to support early reading development.

Discussion: In line with our hypothesis, brain activation was present in the left STS during the phonology task. This suggests that the neural correlates within the STS engaged in phonological processing during speech reading was also activated for phonology during word reading. This expands our knowledge of the role that STS plays in phonological representations. Better understanding of the relation between speech reading, phonological awareness, and word reading may form a basis to support early reading development.

Keywords (if any): fMRI, Reading, Development

Presenter Name: Mary Rodgers
Classification: Graduate
PI: Kaiser, Ann

The Reporting and Quantification of Dosage Received by Children in Caregiver-Implemented Naturalistic Developmental Behavioral Interventions

Mary E. Rodgers, Kathryn Bailey, Molly Reilly, Kelsey Dillehay, Ann P. Kaiser

Introduction: Caregiver-implemented naturalistic developmental behavioral interventions (CI-NDBIs) have shown positive effects for child language outcomes (Sandbank et al., 2020; Schriebman et al., 2017). However, variation in how CI-NDBI dosage received by children is measured and reported limits our understanding of how much and for how long key teaching strategies must be implemented before child outcomes are observed. The purpose of the review and this poster in which it is being disseminated is to report the dosage of CI-NDBIs described in the literature, highlight the gaps observed in the literature, and discuss current and extended guidelines for reporting standards.

Methods: The articles from 10 recent CI-NDBI reviews and 13 additional articles involving populations without autism spectrum disorders produced 258 unique articles that were screened for: (a) an experimental design, (b) an intervention condition including at least one NDBI; and (c) caregivers implementation of an NDBI with their child. Fifty-one articles were included in the final review and coded in REDCap (Harris et al. 2009; Harris et al. 2019). Articles were coded for the current standards of dosage derived from the Warren et al. (2007) framework, consisting of dose, frequency, total intervention duration, and cumulative intervention intensity. The articles were also coded for an extended dosage framework including cumulative appointment duration, minutes of treatment the child received from all intervention agents (i.e., caregiver, therapist, caregiver and therapist combined), and if the actual amount delivered was reported in addition to the intended amount. From this, intervention dosage totals and descriptions could be derived.

Results: The results of this review provide an overview of what dosage occurs in CI-NDBI treatment sessions. Additionally, the results of this review demonstrates a need for standardization in dosage reporting guidelines as illustrated by what was not reported on. Without all facets of dosage measured and reported, we do not know how much treatment each child is receiving or how much treatment is needed for positive outcomes.

Discussion: The results of this review provide an overview of what dosage occurs in CI-NDBI treatment sessions. Additionally, the results of this review demonstrates a need for standardization in dosage reporting guidelines as illustrated by what was not reported on. Without all facets of dosage measured and reported, we do not know how much treatment each child is receiving or how much treatment is needed for positive outcomes.

Keywords (if any): Dosage, Caregiver, NDBI

References (if any):

Harris, P. A., Taylor, R., Minor, B. L., Elliott, V., Fernandez, M., O'Neal, L., McLeod, L., Delacqua, G., Delacqua, F., Kirby, J., & Duda, S. N. (2019). REDCap Consortium, The REDCap consortium: Building an international community of software partners. Journal of Biomedical Information.

Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J.G. (2009). Research electronic data capture (REDCap) - A metadata-driven methodology and workflow process for providing translational research informatics support. Journal of Biomedical Information, 42(2), 377-381.

Sandbank, M., Bottema-Beutel, K., Crowley, S., Cassidy, M., Dunham, K., Feldman, J. I., Crank, J., Albarran, S. A., Raj, S., Mahbub, P., & Woynaroski, T. G. (2020). Project AIM: Autism intervention meta-analysis for studies of young children. Psychological Bulletin, 146(1), 1-29.

Schreibman, L., Dawson, G., Stahmer, A. C., Landa, R., Rogers, S. J., McGee, G. G., Kasari, C., Ingersoll, B., Kaiser, A. P., Bruinsma, Y., McNerney, E., Wetherby, A., & Halladay, A. (2015). Naturalistic Developmental Behavioral Interventions: Empirically validated treatments for autism spectrum disorder. Journal of Autism and Developmental Disorders, 45(8), 2411-2428.

Warren, S. F., Fey, M. E., & Yoder, P. J. (2007). Differential treatment intensity research: A missing link to creating optimally effective communication interventions. Mental Retardation and Developmental Disabilities Research Reviews, 13(1), 70-77.

Presenter Name: Jason Russell
Classification: Postdoc
PI: Newhouse, Paul

Assessing the Relationship between Central Cholinergic Integrity and Amyloid Accumulation in Individuals with Down Syndrome Using [18F]-FEOBV and [11C]-PiB PET: Preliminary Data

Jason K. Russell, Alexander C. Conley, Brian D. Boyd, Rachel Schlossberg., Adam J. Rosenberg, Lealani Mae Y. Acosta, Michael S. Rafii, Sepideh Shokouhi, Paul A. Newhouse

Introduction: Individuals with Down Syndrome (DS) are at high risk of developing Alzheimer's disease (AD). This is partly due to the increased risk conferred by the extra copy of the amyloid precursor protein gene on the triplicate chromosome 21. In AD, cholinergic basal forebrain projections degenerate, playing a significant role in cognitive deficits. In the present study, we assess the relationship between cholinergic integrity, as measured by [18F]-FEOBV uptake, and amyloid accumulation, as measured by [11C]-PiB uptake in individuals with DS.

Methods: Seven non-demented adults with DS completed a FEOBV PET scan and an MRI, six of these individuals also completed a PiB PET scan. Participants over 25 years old were recruited from the TRC-DS study, where individuals undergo multimodal imaging and plasma biomarker assessment. A Brodmann area (BA) atlas from MRIcron and Freesurfer cortical and subcortical parcellations were registered to participants' MRI scans and transformed to native PET space. Regional SUVRs were generated for FEOBV and PiB PET. Initial analysis assessed uncorrected associations between PiB SUVRs, FEOBV SUVRs, and age.

Results: These data show FEOBV uptake is highest in striatal regions, with moderate levels seen in the hippocampus and decreasing throughout cortical regions. This similar pattern to published work in normal individuals suggests FEOBV PET imaging is a valid modality for assessing cholinergic integrity in individuals with DS. While a trend toward a negative association between age and FEOBV SUVR is observed in the parietal cortex, more robust negative associations between regional FEOBV SUVR and regional PiB SUVR are observed. This is consistent with previous studies in individuals with DS, which demonstrated plasma amyloid biomarkers associated with decreasing cholinergic basal forebrain volume, suggesting an important link between amyloid deposition and cholinergic integrity in this population. Interestingly, no association between striatal PiB and FEOBV uptake was observed, despite the striatum displaying early amyloid accumulation in individuals with DS. The lack of striatal FEOBV uptake association with amyloid suggests the intrinsic striatal cholinergic interneurons are relatively preserved despite amyloid accumulation in these non-demented individuals with DS.

Discussion: These data show FEOBV uptake is highest in striatal regions, with moderate levels seen in the hippocampus and decreasing throughout cortical regions. This similar pattern to published work in normal individuals suggests FEOBV PET imaging is a valid modality for assessing cholinergic integrity in individuals with DS. While a trend toward a negative association between age and FEOBV SUVR is observed in the parietal cortex, more robust negative associations between regional FEOBV SUVR and regional PiB SUVR are observed. This is consistent with previous studies in individuals with DS, which demonstrated plasma amyloid biomarkers associated with decreasing cholinergic basal forebrain volume, suggesting an important link between amyloid deposition and cholinergic integrity in this population. Interestingly, no association between striatal PiB and FEOBV uptake was observed, despite the striatum displaying early amyloid accumulation in individuals with DS. The lack of striatal FEOBV uptake association with amyloid suggests the intrinsic striatal cholinergic interneurons are relatively preserved despite amyloid accumulation in these non-demented individuals with DS.

Keywords (if any): Down Syndrome, Amyloid, Cholinergic

Presenter Name: Leesa Sampson
Classification: Research staff

CRISPR interference mouse models for neuroscience research

Leesa Sampson, Jennifer Skelton, Linda Gower, Katarzyna Jopek, Mark Magnuson

Introduction: The mission of the Vanderbilt Genome Editing Resource (VGER) is to facilitate the production, preservation, and distribution of genetically modified mice by VU/VUMC investigators. We have been in existence for thirty years and have an extensive record of productivity and impact. CRISPR inhibition (CRISPRi) is a promising recent technology that complements conventional CRISPR knockout and Cre/loxP strategies for modifying gene expression in the mouse. However, CRISPRi may have advantages over other longstanding methods. The genetics of CRISPRi are simpler, multiple targets can be simultaneously repressed, there is greater quantitative control of gene expression levels, and the repression is reversible.

Methods: We have developed robust strategies that facilitate the design, generation, and validation of new CRISPRi mouse models. Our strategy utilizes piggyBac transgenesis, which is highly efficient, commercially sourced DNAs and other reagents, and recently developed constitutive and inducible dCas9-KRAB alleles.

Results: The development of new CRISPRi models is cost effective and brings novelty to grant applications. We also continue to provide our conventional technologies and services. Please contact us to schedule a private consultation.

Discussion: The development of new CRISPRi models is cost effective and brings novelty to grant applications. We also continue to provide our conventional technologies and services. Please contact us to schedule a private consultation.

Keywords (if any): CRISPR interference, mouse, genome editing

Presenter Name: Michael Sangimino
Classification: Graduate
PI: Park, Sohee

Innovative Online Measure Investigating Embodied Emotions Associated with Trauma

Michael Sangimino, Kathryn Babbitt, Sohee Park

Introduction: Trauma has been linked with disruptions in the sense of self similar to what is seen in individuals with psychosis. Possible consequences include disrupted bodily ownership, self-other distinction, interoception, and embodiment. While previous work has linked trauma and psychosis, the possible connection between psychosis and trauma via bodily disturbances has not been fully explored. The goal of the current study was to investigate how these relationships may be linked in the general population.

Methods: We distributed the anonymous online survey utilizing REDcap (n=103; mean age=29.4; 69.9% women). The Brief Trauma Questionnaire (BTQ) was used to assess trauma and to ascertain those who met the criteria for DSM-5 PTSD. To examine the embodiment of trauma, we created a computerized body mapping task by modifying the BTQ. Additionally, the Prodromal Questionaire-16 (PQ-16) The Depression, Anxiety, and Stress Scale (DASS), the Adverse Childhood Experiences (ACE) questionnaire, Benevolent Childhood Experiences (BCE) questionnaire, and Relationship Questionnaire (RQ) were included.

Results: Past trauma is associated with bodily sensations. Trauma was associated with psychosis-risk, replicating past research. Moreover, we found an increased embodiment of trauma in those at risk for psychosis. Future research needs to examine types of trauma (e.g., interpersonal vs non interpersonal) in relation to the symptoms of the schizophrenia spectrum conditions such as paranoia and hallucinations to understand the routes to psychosis from traumatic events. Lastly, we observed some evidence for the protective role of positive experience in childhood, which might contribute to resilience.

Discussion: Past trauma is associated with bodily sensations. Trauma was associated with psychosis-risk, replicating past research. Moreover, we found an increased embodiment of trauma in those at risk for psychosis. Future research needs to examine types of trauma (e.g., interpersonal vs non interpersonal) in relation to the symptoms of the schizophrenia spectrum conditions such as paranoia and hallucinations to understand the routes to psychosis from traumatic events. Lastly, we observed some evidence for the protective role of positive experience in childhood, which might contribute to resilience.

Keywords (if any): Trauma, Psychosis

Presenter Name: Ava Schwartz
Classification: Undergraduate
PI: Woynaroski, Tiffany

Early Sensory Responsiveness as a Potential Predictor of Early Emerging Anxiety in Infants and Toddler at Increased and General Population Likelihood for Autism: A Study Proposal

Ava Schwartz, Kacie Dunham-Carr, Bahar Keceli-Kaysili, Grace Pulliam, Jennifer Markfeld, Jacob I. Feldman, Tiffany Woynaroski

Introduction: A key feature of autism is differences in sensory responsiveness patterns, including hyporesponsivity, hyperresponsivity, and sensory seeking. The significance of these sensory responsiveness patterns in early childhood stems from their theoretical cascading effects onto higher order skills, such as language. It has been hypothesized that cascading effects may apply to other co-occurring psychiatric conditions, such as anxiety. If a relation can be identified between sensory responsiveness and anxiety in infants, early sensory differences may contribute to emerging childhood anxiety, facilitating earlier detection and intervention on emerging anxiety. This could improve social, academic, and emotional functioning later in life, aiding in the mitigation of both anxiety and autism symptoms. The Sensory Project in Infant Siblings (SPIS) is a longitudinal study that prospectively follows the infant siblings of both autistic (Sibs-Autism) and non-autistic (Sibs-NA) children over a 5 year period. The study measures the three aforementioned patterns of sensory responsiveness and anxiety in infants at high and low likelihood for autism using a variety of methods. The goal of this study is to evaluate the relation between sensory responsiveness and anxiety prospectively in infants at both high and low likelihood for autism.

Methods: Analyses will be conducted on 50 total participants (25 Sibs-Autism, 25 Sibs-NA). The measures of sensory responsiveness will be administered at participants' Time 1 appointment (12-18 months old) and include the Sensory Processing Assessment (SPA), the Test of Sensory Function in Infants (TSFI), the Infant Toddler Sensory Profile Caregiver Questionnaire (SP), and the Sensory Experiences Questionnaire (SEQ). The Parent-Rated Anxiety Scale (PRAS-ASD) will be used to measure participant anxiety at their Time 4 appointments (5 years old).

Results: If a longitudinal correlation is found between early sensory responsiveness and later anxiety in this sample, the results will provide empirical support for the validity of altered sensory response patterns as a potential predictor of later anxiety. Such a finding would suggest that early sensory responsiveness may signal a need for early anxiety intervention, which could help improve social, academic, and emotional outcomes later in life for both populations at elevated and general population-level likelihood for autism.

Discussion: If a longitudinal correlation is found between early sensory responsiveness and later anxiety in this sample, the results will provide empirical support for the validity of altered sensory response patterns as a potential predictor of later anxiety. Such a finding would suggest that early sensory responsiveness may signal a need for early anxiety intervention, which could help improve social, academic, and emotional outcomes later in life for both populations at elevated and general population-level likelihood for autism.

Keywords (if any): Sensory, Anxiety, Autism

References (if any):

Cascio, C. J., Woynaroski, T., Baranek, G. T., & Wallace, M. T. (2016). Toward an interdisciplinary approach to understanding sensory function in autism spectrum disorder. Autism Research, 9, 920-925. https://doi.org/10.1002/aur.1612

Feldman, J., Cassidy, M., Liu, Y., Kirby, A., Wallace, M., & Woynaroski, T. (2020). Relations between Sensory Responsiveness and Features of Autism in Children. Brain Sciences, 10(11), 775. https://doi.org/10.3390/brainsci10110775

Levit-Binnun, N., Szepsenwol, O., Stern-Ellran, K., & Engel-Yeger, B. (2014) The relationship between sensory responsiveness profiles, attachment orientations, and anxiety symptoms, Australian Journal of Psychology, 66:4, 233-240, https://doi.org/10.1111/ajpy.12064

Neil, A. L., & Christensen, H. (2009). Efficacy and effectiveness of school-based prevention and early intervention programs for anxiety. Clinical Psychology Review, 29(3), 208-215. https://doi.org/10.1016/j.cpr.2009.01.002

Presenter Name: Mattie Scoggins
Classification: Graduate
PI: Hodapp, Bob

Advocates and Grit: How the Volunteer Advocacy Project Impacts Grit in it's Graduates

Mattie Scoggins, Elizabeth Rossi, and Robert Hodapp

Introduction: Particularly as concerns students with disability and their entire Individualized Education Plan (IEP) process, parents are expected to be full and equal participants. But in order to participate like other IEP team members, educational advocates often help parents and other stakeholders navigate the complexities of the IEP process. But beyond increased knowledge per se, parents often benefit from particular personality characteristics to advocate most effectively for their child. This study examines pre- and post-test scores on one such measure, Grit. As determined by Duckworth and Quinn (2009), grit is defined as "trait-level perseverance and passion for long-term goals" (Duckworth & Quinn, 2009). Given that parents often need high levels of grit in dealing with their child's schools, we wanted to analyze the pre- and post-tests from the Volunteer Advocacy Project (VAP) to measure if formal advocacy training had an impact on the participant's levels of grit and to determine baseline levels of this construct.

Methods: Fifty-four (n = 54) parents and advocates participated in this multi-year study. Participants all attended the Vanderbilt Kennedy Center's Volunteer Advocacy Project, or VAP, a 12-week program that aims to prepare advocates for the IEP process. Over the course of 3 years, participants completed a pre- and post-test that among other things measured their levels of grit. The grit measurement used was the Short Grit Scale (Grit-S) developed by Duckworth & Quinn. This test has been validated through the research of Duckworth and colleagues over time (Duckworth & Quinn, 2009). Specifically, respondents were asked to rate their agreement with the following statements: "(1) I often set a goal but later choose to pursue a different one; (2) I haven been obsessed with a certain ideal or project for a short time but later lost interest.....(7) I am diligent; (8) I am a hard worker" (Duckworth & Quinn, 2009). All Grit items were recoded so that they represented a Likert-type response from along a least grit to most grit scale.

Results: As noted by Duckworth & Quinn (2009), one's level of grit appears to be an important predicator of real-life success. This study, the first to include the grit construct within the advocacy context, begins to pinpoint which aspects might make for more successful special education advocates. Knowledge about the role of grit in VAP participants could inform future advocacy training programs and advocacy research.

Discussion: As noted by Duckworth & Quinn (2009), one's level of grit appears to be an important predicator of real-life success. This study, the first to include the grit construct within the advocacy context, begins to pinpoint which aspects might make for more successful special education advocates. Knowledge about the role of grit in VAP participants could inform future advocacy training programs and advocacy research.

Keywords (if any): Advocacy, Grit

Presenter Name: Linjie Shi
Classification: Graduate
PI: Bonino, Angela

Effects of child age and developmental disability status on behavioral hearing assessment practices

Linjie Shi; Angela Y. Bonino

Introduction: Because the audiogram is recognized as the gold-standard hearing assessment for infants (> 6 months) and children, obtaining accurate thresholds is often the cornerstone upon which timely diagnosis and access to interventions is built. To measure thresholds, clinical behavioral methods are used which are based on the assumptions of typical child development across multiple domains. Consequently, the developmental demands of these methods are often misaligned with the developmental abilities of children who have diverse or complex developmental profiles. The purpose of the present study was to evaluate behavioral assessment practices during the first clinical encounter as a function of age and developmental disability status.

Methods: We analyzed audiogram and diagnosis data from 121,186 children (4 months - 19 years) who received hearing healthcare at three hospitals in the United States. Based on their first encounter with audiogram thresholds, we counted the total number of thresholds completed and the type of threshold. Hearing status was determined for children based on the first audiogram or auditory brainstem response (ABR) testing that had sufficient data. Reduced hearing required an audiogram with a pure-tone average of > 25 dB HL, or an ABR threshold > 30 dB nHL. Children were stratified into five developmental groups based on their ICD-9/10 diagnostic code: autism spectrum disorder; Down syndrome; cerebral palsy; intellectual disability; or comparison group. 9% of the children had a developmental disability.

Results: The findings offered key insights to current clinical practices for the assessment of hearing with behavioral methods for children who have developmental disabilities. Results from this study indicate noticeable differences - in terms of quantity and quality of behavioral thresholds -based on age and disability status. Results from this study shine light on a potential challenge in hearing healthcare that may lead to missed or late identification of reduced hearing: behavioral hearing assessment practices do not appear to be tailored to the hearing profiles that commonly co-occur with specific disabilities.

Discussion: The findings offered key insights to current clinical practices for the assessment of hearing with behavioral methods for children who have developmental disabilities. Results from this study indicate noticeable differences - in terms of quantity and quality of behavioral thresholds -based on age and disability status. Results from this study shine light on a potential challenge in hearing healthcare that may lead to missed or late identification of reduced hearing: behavioral hearing assessment practices do not appear to be tailored to the hearing profiles that commonly co-occur with specific disabilities.

Keywords (if any): developmental disabilities, hearing, children

Presenter Name: Elijah Simon
Classification: Undergraduate
PI: Kang, Jing-Qiong

From Bench to Bedside: 4-Phenylbutyrate Rescue of the Mutant Protein in GABRG2 Mutation Associated with Febrile Seizures and Extended Phenotypes

Elijah W. Simon, Aiden J. Delahanty, Emmett Casteel, Brayden Zhang, Wangzhen Shen, Karishma Randhave, Ziang Song, Martin Gallagher, Jing-Qiong Kang

Introduction: Epilepsy is a neurological disorder characterized by recurrent seizures, and it can be caused by mutations (pathological variants) in various genes, including those encoding the GABAA receptor subunits. The Kang Lab focuses on understanding how these genetic mutations contribute to epilepsy for individuals suffering from various epilepsy syndromes and neurodevelopmental disorders. This project has focused on the GABRG2, one of the major GABAA receptor subunit genes. Mutations in GABAA receptor subunit genes are frequently associated with febrile seizures, generalized tonic-clonic seizures with febrile seizure plus (GEFS+), and a severe form of epilepsy known as Dravet syndrome. We recently identified that 4-phenylbutyrate (PBA) can promote trafficking of the SLC6A1 encoded GABA transporter 1, mitigate seizures in mice, and increase total protein levels in haploinsufficient cells for SLC6A1 mutations. The primary objective of this study was to investigate the pathophysiology and therapeutic potential of 4-phenylbutyrate (PBA) in restoring protein levels and reducing seizures in haploinsufficient models of disease that include both cell and mouse models.

Methods: To achieve our objective, we generated a GABAA receptor subunit mutation plasmid library and gene knockout or knock-in mice. We first used transient transfection of the wildtype and the mutant γ2 subunit containing receptors. We formed the recombinant receptors with the most abundant subunit isoform α1, β2, and γ2s, the short form of the γ2 subunit. Tissue was extracted from these mice, and samples were processed and prepared for analysis. We divided the cells into two groups: group A was untreated, while group B was treated with PBA. Western blotting was performed to assess protein concentration in both groups.

Results: The significance of this study lies in the potential clinical benefit of PBA in reducing seizures in individuals with GABAA receptor subunit gene mutations and related conditions, such as GABRG2 mutation-related epilepsy syndrome. If further research confirms the efficacy of PBA as an anti-seizure medication, it could offer a readily available and transformative treatment option, substantially improving the quality of life for affected patients by reducing the burden of seizures. Future studies involving cellular and clinical experiments are needed to validate these findings and pave the way for improved therapeutic interventions.

Discussion: The significance of this study lies in the potential clinical benefit of PBA in reducing seizures in individuals with GABAA receptor subunit gene mutations and related conditions, such as GABRG2 mutation-related epilepsy syndrome. If further research confirms the efficacy of PBA as an anti-seizure medication, it could offer a readily available and transformative treatment option, substantially improving the quality of life for affected patients by reducing the burden of seizures. Future studies involving cellular and clinical experiments are needed to validate these findings and pave the way for improved therapeutic interventions.

Keywords (if any): Epilepsy, Haploinsufficiency, Genetics

Presenter Name: Anna Kathleen Spitler
Classification: Research staff
PI: Wagner, Liliana

ASD-PEDS-PC: Can a novel tool help primary care providers identify autism risk?

Anna Kathleen Spitler, Jeffrey Hine, Tori Foster, Makayla Honaker, and Liliana Wagner

Introduction: Early detection and intervention for developmental disabilities are critical to optimize outcomes and well-being for children and their families. There are currently significant delays between parents' first developmental concerns (17-19 months) and the median age of autism spectrum disorder (ASD) diagnosis (52 months). Parents with developmental concerns are often told to follow a "wait and see" approach, leaving them unequipped to provide their child with the tools needed for developmental success. The current ASD screening tools that providers have at their disposal are lacking. Parent questionnaires (i.e. M-CHAT and SCQ) result in high rates of both false negative and false positive results. Current direct observation screeners (i.e. ADEC, STAT, RITA-T, and TIDOS) have high demands for time, money, and training. The ASD-PEDS-PC was designed to account for and improve upon the limitations of its predecessors.

Methods: The ASD-PEDS-PC is an interactive screening tool designed with seven key predictive behaviors for ASD in mind. It allows for quick administration and uses materials that are readily available in most primary care offices. The current study brings pediatric primary care providers into our clinic to administer the ASD-PEDS-PC with two previously evaluated children, 18-36 months, in an attempt to understand the potential utility, feasibility, and acceptability of this tool.

Results: Preliminary rates of concurrence, satisfaction, and system usability suggest that the ASD-PEDS-PC has potential for identifying or ruling out ASD in primary care settings. In the future, we hope to widely distribute the ASD-PEDS-PC as an open-access tool to maximize its potential reach across community settings. Future work should focus on understanding the tool's psychometric functioning across larger groups of children and providers and validating the preliminary scoring procedures.

Discussion: Preliminary rates of concurrence, satisfaction, and system usability suggest that the ASD-PEDS-PC has potential for identifying or ruling out ASD in primary care settings. In the future, we hope to widely distribute the ASD-PEDS-PC as an open-access tool to maximize its potential reach across community settings. Future work should focus on understanding the tool's psychometric functioning across larger groups of children and providers and validating the preliminary scoring procedures.

Keywords (if any): Autism, Primary Care, Screening

Presenter Name: Leah Sulmonetti
Classification: Graduate
PI: Hodapp, Robert

Social Determinants of Health Among Children with Disabilities and Mental Health Concerns in Tennessee

Leah Sulmonetti, Gabriela Herrera Espinosa, Verity Rodrigues, & Robert M. Hodapp

Introduction: To improve mental health for all children, the public health community has acknowledged the need to address the social determinants of health. Social determinants of health are the social, physical, and economic factors in the environment that impact the overall health of an individual. Currently, we know little about how the social determinants of health relate to the use of mental health services in youths with disabilities. The current study examines social determinants of health in 16 areas to see which determinants are affecting children with disabilities and their mental/behavioral health concerns.

Methods: This ongoing study involved responses by Tennessee caregivers to an online needs assessment survey. To date, approximately 100 caregivers have responded, each of whom has a child with a disability and mental/behavioral health concerns between the ages of 1.5-22 years old. In the survey, caregivers were asked about demographics, information, and medical history of the child, what mental/behavioral health services they've utilized, barriers to receiving services, adverse childhood experiences, social determinants of health, and reflections. In terms of social determinants of health, caregivers were asked about how confident they feel in 16 different services within their community including education, healthcare, racial discrimination, affordable housing, and safety in the community.

Results: As one of the few studies to examine social determinants of health among children with disabilities, these findings have implications regarding mental/behavioral health. Social determinants of health play a crucial role in shaping an individual's health status both mentally and physically. We need more research on social determinants of health to understand how to eliminate public health barriers and find interventions that work to promote access to mental health services for children with disabilities.

Discussion: As one of the few studies to examine social determinants of health among children with disabilities, these findings have implications regarding mental/behavioral health. Social determinants of health play a crucial role in shaping an individual's health status both mentally and physically. We need more research on social determinants of health to understand how to eliminate public health barriers and find interventions that work to promote access to mental health services for children with disabilities.

Keywords (if any): mental health, social determinants of health, children with disabilities

Presenter Name: Kenny Tang
Classification: Graduate
PI: Cutting, Laurie E.

Updated and Recalculated Grapheme-Phoneme Probabilities in American English

Kenny A. Tang, Joon S. Choi, Laurie E. Cutting, Scott Crossley

Introduction: Lesson-to-text matching is a commonly used method in practice to determine the decodability of text. While this controls for text readability in terms of decoding difficulty for beginning readers, it is not based on quantifiable metrics of each word's decoding difficulty. For these reasons, there are benefits to creating a measure that can quantifiably capture decoding difficulty. Prior research has shown that, not surprisingly, vowel and consonant conditional probabilities, which is the probability that a grapheme will make a specific phoneme sound, predicts whether a child will accurately decode a word beyond word frequency (Saha et al., 2020). However, the probabilities used in this prior research were sourced from a paper from Berndt et al. (1987), which is limited in that it has a relatively small word corpus. Importantly, it also may not capture the potential vowel shifts in speech within the United States that may have occurred in the last three decades. The goal of the current work was to create an updated list of consonant and vowel conditional probabilities using a larger corpus of words with more modern phonetic speech patterns, as well as began exploring whether this updated metric can better predict the probability of accurately decoding words of varying difficulty.

Methods: 92,838 words were parsed into 555,255 grapheme-phoneme pairs. Parsed phonemes were sourced from the Carnegie Mellon's Pronunciation Dictionary (CMU; http://www.speech.cs.cmu.edu/cgi-bin/cmudict!) and words were split into graphemes that matched these phonetic parses. For each grapheme, conditional probabilities were calculated for each associated phoneme and then were compared to those in Berndt et al. (1987).

Results: Future research is necessary to determine if these newly calculated probabilities may be better able to be integrated in with other measures to capture the decoding difficulty of texts. Ongoing research is examining whether these conditional probabilities, as well as other novel ways of capturing decoding difficulty, can predict decoding difficulty of texts beyond other common word-level metrics such as word frequency, word length, etc.

Discussion: Future research is necessary to determine if these newly calculated probabilities may be better able to be integrated in with other measures to capture the decoding difficulty of texts. Ongoing research is examining whether these conditional probabilities, as well as other novel ways of capturing decoding difficulty, can predict decoding difficulty of texts beyond other common word-level metrics such as word frequency, word length, etc.

Keywords (if any): decoding, reading, vowel shifts

References (if any):

Berndt, R. S., Reggia, J. A., & Mitchum, C. C. (1987). Empirically derived probabilities for grapheme-to-phoneme correspondences in english. Behavior Research Methods, Instruments, & Computers, 19(1), 1-9. https://doi.org/10.3758/BF03207663

Saha, N. M., Cutting, L. E., Del Tufo, S., & Bailey, S. (2021). Initial validation of a measure of decoding difficulty as a unique predictor of miscues and passage reading fluency. Reading and Writing, 34(2), 497-527. https://doi.org/10.1007/s11145-020-10073-x

Presenter Name: Claire Tate
Classification: Undergraduate
PI: Booth, James

The Relation of Depriving and Threatening Childhood Experiences of Adversity to Lexical Processing, Valence Reactivity, and Working Memory

Claire M. Tate, Alisha B. Compton, Jiulin Dai, Neelima Wagley, James R. Booth

Introduction: Adversity has been shown to have behavioral effects on children's emotion regulation (Humpherys & Zeanah, 2015), language and literacy (Merz et al., 2013) and working memory (Shields et al., 2016). Thus, early adversity may be a common factor underlying variability in these processes. A dimensional model of adversity includes deprivation, a lack of expected cognitive and social input from the environment, and threat, exposure to harmful events (McLaughlin et al., 2014). Deprivation is related to language processing (Miller et al., 2021), threat exposure is related to valence reactivity (Schäfer et al., 2023); both are related to working memory with deprivation being more related (Johnson et al. 2021). We examine whether the relations for lexical processing and valence reactivity are unique, and whether the relations with working memory are general.

Methods: 35 children 7-12 years old (Mage=10.22) participated in this preregistered study (https://osf.io/wzgsq). Parents reported on childhood deprivation (ECLS) and threat exposure (VEX-R). Participants completed a rhyming task measuring three constructs: lexical processing (low- vs. high-frequency words), valence reactivity (negative vs. neutral images), and working memory (2- vs. 1-back load). Task performance was evaluated using accuracy and RT. Planned and exploratory analyses examined (1) unique variance explained in performance by the interaction of each construct with threat and deprivation and (2) unique variance explained by threat and deprivation, with low-frequency, negative, and 2-back performance as the outcome variables.

Results: Overall, we observed weak evidence for the relation of threat to RT across task constructs, which is inconsistent with a dimensional model of adversity. Yet, early violence exposure may have long-term effects on executive functioning, specifically components influenced by attention and processing speed (Clark et al., 2022). A child who takes longer to process information may exhibit slower RT across challenging task conditions. We are further examining these relations by currently investigating neural differences to uncover effects that may be masked by compensatory strategies of task performance.

Discussion: Overall, we observed weak evidence for the relation of threat to RT across task constructs, which is inconsistent with a dimensional model of adversity. Yet, early violence exposure may have long-term effects on executive functioning, specifically components influenced by attention and processing speed (Clark et al., 2022). A child who takes longer to process information may exhibit slower RT across challenging task conditions. We are further examining these relations by currently investigating neural differences to uncover effects that may be masked by compensatory strategies of task performance.

Keywords (if any): adversity, language processing, emotion regulation

References (if any):

Clark, H. M., Grogan-Kaylor, A. C., Galano, M. M., Stein, S. F., & Graham-Bermann, S. A. (2022). Preschoolers' Intimate Partner Violence Exposure and Their Speeded Control Abilities Eight Years Later: A Longitudinal Mediation Analysis. Journal of interpersonal violence, 37(19-20), NP18496-NP18523. https://doi.org/10.1177/08862605211035883

Humphreys, K.L. and C.H. Zeanah. (2105). Deviations from the expectable environment in early childhood and emerging psychopathology. Neuropsychopharmacology, 40(1): p. 154.

Johnson, D., Policelli, J., Li, M., Dharamsi, A., Hu, Q., Sheridan, M. A., McLaughlin, K. A., & Wade, M. (2021). Associations of Early-Life Threat and Deprivation With Executive Functioning in Childhood and Adolescence: A Systematic Review and Meta-analysis. JAMA pediatrics, 175(11), e212511. https://doi.org/10.1001/jamapediatrics.2021.2511

McLaughlin, K. A., Sheridan, M. A., & Lambert, H. K. (2014). Childhood adversity and neural development: deprivation and threat as distinct dimensions of early experience. Neuroscience and biobehavioral reviews, 47, 578-591. https://doi.org/10.1016/j.neubiorev.2014.10.012

Merz, E.C., R.B. McCall, and A.J. Wright. (2013). Attention and language as mediators of academic outcomes following early psychosocial deprivation. International Journal of Behavioral Development, 37(5): p. 451-459. Miller, A.B., Machlin, L., McLaughlin, K.A. and Sheridan, M.A. (2021), Deprivation and psychopathology in the Fragile Families Study: A 15-year longitudinal investigation. J Child Psychol Psychiatr, 62: 382-391.
https://doi.org/10.1111/jcpp.13260

Schäfer, J. L.,McLaughlin, K. A., Manfro, G. G., Pan, P., Rohde, L. A., Miguel, E. C., Simioni, A., Hoffmann, M. S., & Salum, G. A. (2023). Threat and deprivation are associated with distinct aspects of cognition, emotional processing, and psychopathology in children and adolescents. Developmental Science, 26, e13267. https://doi.org/10.1111/desc.13267

Shields, G. S., Sazma, M. A., & Yonelinas, A. P. (2016). The effects of acute stress on core executive functions: A meta-analysis and comparison with cortisol. Neuroscience and biobehavioral reviews, 68, 651-668. https://doi.org/10.1016/j.neubiorev.2016.06.038

Presenter Name: Shreyas Teegala
Classification: Undergraduate
PI: McDaniel, Jena

Exploring the Relation Between Social Identity and Language Skills in American Sign Language and Spoken English for Deaf and Hard of Hearing Children

Shreyas Teegala, Angie Walker, Jena McDaniel

Introduction: Learning and health outcomes are often modulated by social identity variables (e.g., race and socioeconomic status). For deaf and hard-of-hearing (DHH) children, gaps between their language skills and those of their typical hearing peers may be exacerbated by various aspects of their social identity. In this exploratory analysis, we evaluate the relation between several social identity variables and language skills. Research question 1 (RQ1): Do white and non-white DHH children differ in performance on the American Sign Language (ASL)/English Language Milestones? RQ2: Do DHH children from urban and non-urban backgrounds differ in performance on the ASL/English Language Milestones? RQ3: Does regional median household income positively correlate with ASL and English skills?

Methods: We conducted a secondary analysis of the ASL/English Language Milestones measure performance from a prior descriptive analysis of 90 DHH children who use ASL (n = 42) and/or spoken English (n = 76). For the current analysis, we collected caregiver-reported demographic data to determine race, population density, and regional median household income. We compare language quotient scores from the ASL/English Language Milestones measure for children from urban versus non-urban backgrounds (RQ1) and white vs non-white children (RQ2). Dichotomous variables are necessary due to sample size. For RQ3, we evaluate the correlation between income and ASL and English language quotient scores.

Results: The preliminary findings suggest that there are complex relations between social identity and other child variables, including language skills, that warrant continued investigation. Identifying the presence of and then the contributing factors for health disparities is important for supporting optimal outcomes for DHH children.

Discussion: The preliminary findings suggest that there are complex relations between social identity and other child variables, including language skills, that warrant continued investigation. Identifying the presence of and then the contributing factors for health disparities is important for supporting optimal outcomes for DHH children.

Keywords (if any): language, deaf and hard of hearing, social identity

Presenter Name: Adriana Tienda
Classification: Research staff
PI: Harrison, Fiona

Chronic developmental manganese exposure alters response to amphetamine and methylphenidate

Adriana A Tienda, Krista C Paffenroth, Erin S Calipari, Fiona E Harrison

Introduction: Attention Deficit Hyperactivity Disorder (ADHD) is a highly heritable condition, but strong evidence implicates environmental exposures from air pollution and contaminated or poorly treated water supplies in exacerbation of the clinical phenotypes. Mn is an essential trace element required for human health including development of dopaminergic (DA) neurons. Chronic excess Mn exposure, even at levels that are not acutely toxic, may contribute to behavioral challenges and response to drugs that target dopaminergic systems. Dopamine transporter (DAT) inhibition via methylphenidate blocks reuptake, increases synaptic DA and mitigates symptoms of ADHD. In this study we sought to establish whether Mn exposure to juvenile mice altered response to amphetamine and methylphenidate in mice.

Methods: Male and female heterozygous DATT356M and wild-type littermates were pseudo randomly assigned to receive control (tap water) or high Mn (2.5 mg/ml) via water from weaning (21-28 days) for 4-5 weeks. The DATT356M mutation was originally identified in a male patient with clinical report of restricted, repetitive and stereotyped behaviors. This mutation drives reverse transport of dopamine in neurons leading to impaired clearance of DA at the synapse. Mice underwent repeated testing in locomotor activity chambers for three days (60 mins.) to ensure that they were fully habituated to the environments. On the fourth day a 3-hour activity session was conducted following treatment with amphetamine (3 mg/kg) or methylphenidate (5 mg/kg). The second drug was administered in a second 3-hour activity session following a 1 week wash-out period.

Results: These data have important implications for the treatment of developmental disorders. Expression of behavioral phenotypes may differ according to environmental toxin exposure as well as genetic predisposition. Importantly, exposure to Mn in the environment in non-toxic levels may alter efficacy of commonly used treatments for neuropsychiatric disorders with further differences according to sex. Future directions of this project are to identify the molecular basis of the effect of Mn including changes to DAergic metabolism and transport and post-translational modification to the DAT.

Discussion: These data have important implications for the treatment of developmental disorders. Expression of behavioral phenotypes may differ according to environmental toxin exposure as well as genetic predisposition. Importantly, exposure to Mn in the environment in non-toxic levels may alter efficacy of commonly used treatments for neuropsychiatric disorders with further differences according to sex. Future directions of this project are to identify the molecular basis of the effect of Mn including changes to DAergic metabolism and transport and post-translational modification to the DAT.

Keywords (if any): Dopamine, Behavior, Mouse

Presenter Name: Lauren Weittenhiller
Classification: Graduate
PI: Sheffield, Julia

Deciding to be Left Alone After Being Left Out: Responses to Social Exclusion in Schizophrenia Spectrum Disorder

Lauren P. Weittenhiller, Ann M. Kring

Introduction: People with schizophrenia have smaller social networks and are twice as likely to report feeling lonely as those without schizophrenia [1,2]. This is of critical concern, as lack of social engagement is among the leading causes of premature mortality, comparable to well-established risk factors such as smoking or obesity [3]. One contributor to poor social outcomes associated with schizophrenia may be a heightened risk of social exclusion and subsequent social withdrawal. People with schizophrenia are more likely to be excluded than those with other serious illnesses, such as AIDS [4]. Following exclusion, social withdrawal may be pursued to avoid future exclusion, but it may also increase the likelihood of being excluded, thus engaging a vicious cycle [5]. To determine whether people with schizophrenia may be unduly impacted by this cycle, this study represents the first empirical investigation of behavioral responses to exclusion in schizophrenia.

Methods: We recruited people with (n=43) and without (n=43) schizophrenia spectrum disorders from across the United States to play a modified version of the virtual ball-toss game, Cyberball. After participants are excluded in Cyberball, they were given the choice to respond to the other players using affiliative, retaliatory, and withdrawal behaviors. To assess whether exclusion differs from other negative experiences, we also included a disappointment game, in which the participant was unable to interact with other other players due to a supposed program malfunction. Participants also reported on their attributions for being excluded, intended future behavior, and real-world social experiences.

Results: Findings from this study suggest that exclusion is a particularly salient social experience for people with schizophrenia that may contribute to difficulty in attaining social goals. These data also provide the first evidence that people with schizophrenia experience heightened self-blame following exclusion and may be particularly vulnerable to a cycle of social withdrawal perpetuating social exclusion. Further exploration into how these cognitions and behaviors may be contributing to the social challenges that this already stigmatized population face is of utmost importance for developing more targeted social interventions for people with schizophrenia.

Discussion: Findings from this study suggest that exclusion is a particularly salient social experience for people with schizophrenia that may contribute to difficulty in attaining social goals. These data also provide the first evidence that people with schizophrenia experience heightened self-blame following exclusion and may be particularly vulnerable to a cycle of social withdrawal perpetuating social exclusion. Further exploration into how these cognitions and behaviors may be contributing to the social challenges that this already stigmatized population face is of utmost importance for developing more targeted social interventions for people with schizophrenia.

Keywords (if any): Social Exclusion, Schizophrenia/Psychosis, Social Withdrawal

References (if any):

Gayer-Anderson, C., & Morgan, C. (2013). Social networks, support and early psychosis: a systematic review. Epidemiology and psychiatric sciences, 22(2), 131-146.
Stain, H. J., Galletly, C. A., Clark, S., Wilson, J., Killen, E. A., Anthes, L., ... & Harvey, C. (2012). Understanding the social costs of psychosis: the experience of adults affected by psychosis identified within the second Australian National Survey of Psychosis. Australian & New Zealand Journal of Psychiatry, 46(9), 879-889.
Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. Perspectives on Psychological Science, 10(2), 227-237.
Corrigan, P. W., River, L. P., Lundin, R. K., Wasowski, K. U., Campion, J., Mathisen, J., ... & Kubiak, M. A. (2000). Stigmatizing attributions about mental illness. Journal of Community Psychology, 28(1), 91-102.
Wesselmann, E. D., Williams, K. D., & Nida, S. A. (2016). Social exclusion, ostracism, and rejection research: Where do we go from here? In Williams, K. D. & Nida, S. A. (Eds.) Ostracism, exclusion, and rejection (pp. 273-289). New York, NY: Psychology Press.

Presenter Name: Zachary Williams
Classification: Graduate
PI: Woynaroski, Tiffany

An overlooked mental health condition: First estimates of prevalence and clinical correlates of misophonia in cognitively-able autistic adults

Zachary J. Williams, D. Jonah Barrett, Carissa J. Cascio, and Tiffany G. Woynaroski

Introduction: Misophonia is a newly-described psychiatric disorder in which individuals have strong negative emotional responses (typically extreme irritation, anger, or disgust) in response to specific "trigger" sounds (e.g., chewing, tapping, and sniffling), resulting in significant distress, pathological avoidance behavior, and impairment in daily life (Swedo et al., 2022). There is a sizable body of evidence to suggest that misophonia, like other forms of decreased sound tolerance, is common in the autistic population (Williams et al., 2021). However, the prevalence of this specific phenotype (as opposed to other forms of sound intolerance such as hyperacusis and phonophobia) and its effects on mental health and well-being remain poorly understood. The objective of this study was to describe the prevalence, clinical features, and correlates of suspected misophonia (based on a validated screening tool) in a large sample of cognitively-able autistic adults.

Methods: Independent autistic adults aged 18-80 years (n=936, MAge=37.49 years, 63.0% female sex, 80.1% non-Hispanic White, median age of autism diagnosis=23.2 years) were recruited via Simons Powering Autism Research for Knowledge (SPARK) Research Match (Feliciano et al., 2018), as part of a study of sensory differences in autism (RM0111Woynaroski_DST). Misophonia status was determined using the Duke-Vanderbilt Misophonia Screening Questionnaire (DVMSQ; Williams et al., 2022), and both the DVMSQ and Duke Misophonia Questionnaire (DMQ; Rosenthal et al., 2021) were used to characterize the misophonia phenotype.

Results: Misophonia was highly prevalent in the present sample of cognitively-able autistic adults, with over 35% screening positive for the condition. Misophonia status is a significant predictor of many relevant mental health outcomes in autistic individuals, highlighting the need for additional research on this understudied disorder and its role in the well-being of autistic adults.

Discussion: Misophonia was highly prevalent in the present sample of cognitively-able autistic adults, with over 35% screening positive for the condition. Misophonia status is a significant predictor of many relevant mental health outcomes in autistic individuals, highlighting the need for additional research on this understudied disorder and its role in the well-being of autistic adults.

Keywords (if any): Autism, Misophonia, Prevalence

References (if any):

Swedo, S. E., Baguley, D. M., Denys, D., Dixon, L. J., Erfanian, M., Fioretti, A., ... & Raver, S. M. (2022). Consensus definition of misophonia: a delphi study. Frontiers in Neuroscience, 16, 841816.
Williams, Z. J., He, J. L., Cascio, C. J., & Woynaroski, T. G. (2021). A review of decreased sound tolerance in autism: Definitions, phenomenology, and potential mechanisms. Neuroscience & Biobehavioral Reviews, 121, 1-17.
Feliciano, P., Daniels, A. M., Snyder, L. G., Beaumont, A., Camba, A., Esler, A., ... & Brewster, S. J. (2018). SPARK: A US cohort of 50,000 families to accelerate autism research. Neuron, 97(3), 488-493.
Williams, Z. J., Cascio, C. J., & Woynaroski, T. G. (2022). Psychometric validation of a brief self-report measure of misophonia symptoms and functional impairment: the duke-vanderbilt misophonia screening questionnaire. Frontiers in Psychology, 13, 897901.
Rosenthal, M. Z., Anand, D., Cassiello-Robbins, C., Williams, Z. J., Guetta, R. E., Trumbull, J., & Kelley, L. D. (2021). Development and initial validation of the duke misophonia questionnaire. Frontiers in psychology, 12, 709928.

Presenter Name: Gabija Zilinskaite
Classification: Research staff
PI: Hine, Jeffrey

Embedding ASD Diagnostic Telemedicine Services in Primary Care Settings

Anna Kathleen Spitler, Gabija Zilinskaite, Jillian Hamilton, Tori Foster, Yewande DaDa, Caitlin Stone, and Jeffrey Hine

Introduction: This project assesses the feasibility of implementing tele-diagnostic and primary care provider-facilitated evaluations to reduce the latency from autism spectrum disorder (ASD) referral to scheduled evaluations and the age at which a diagnosis is made. Early and accurate identification for ASD is critical for families to access necessary evidence-based services for their children. Unfortunately, families are not always able to readily access appropriate and timely evaluations and intervention for early autism concerns (Constantino et al., 2020). Telemedicine diagnostic approaches allow supports to be embedded across contexts and significantly decrease service delays (Juarez et al., 2018).

Methods: Primary care providers (PCPs) are well positioned to play a critical role in ASD service provision. Our medical center has a current initiative to expand and streamline our ASD assessment clinics via tele-diagnostic evaluations and embedded providers. Embedded diagnostic services can increase the capacity of primary care providers to facilitate a more familiar and proximal evaluation space for patients. Participants include children across seven primary care clinics affiliated with our medical center and children's hospital, including five clinics located in rural areas across our state. Children are screened by their PCPs (i.e., determined to be at-risk on Modified Checklist for Autism in Toddlers, M-CHAT) and referred through a specific pathway. Evaluations occurred in-person in a primary care clinic or virtually via telehealth with participants joining calls from their primary care clinic or home.

Results: As the prevalence of ASD continues to increase, with 1 in 36 children identified with autism (Centers for Disease Control and Prevention, 2023), innovative approaches such as embedded services and telemedicine are required to address service delays and gaps in access. This important work improves use of resources, addresses disparities, and allows for improved continuity of care for children and families.

Discussion: As the prevalence of ASD continues to increase, with 1 in 36 children identified with autism (Centers for Disease Control and Prevention, 2023), innovative approaches such as embedded services and telemedicine are required to address service delays and gaps in access. This important work improves use of resources, addresses disparities, and allows for improved continuity of care for children and families.

Keywords (if any): Autism, Primary care, Diagnostic services

References (if any):

Centers for Disease Control and Prevention. (2023). Data & Statistics on Autism Spectrum Disorder. Retrieved from https://www.cdc.gov/ncbddd/autism/data.html.
Chen, Y., Drye, M., Chen, Q., Fecher, M., Liu, G., & Guthrie, W. (2023). Delay from Screening to Diagnosis in Autism Spectrum Disorder: Results from a Large National Health Research Network, The Journal of Pediatrics, Volume 260, 113514, 0022-3476. https://doi.org/10.1016/j.jpeds.2023.113514.
Constantino, J. N., Abbacchi, A. M., Saulnier, C., Klaiman, C., Mandell, D. S., Zhang, Y., Hawks, Z., Bates, J., Klin, A., Shattuck, P., Molholm, S., Fitzgerald, R., Roux, A., Lowe, J. K., & Geschwind, D. H. (2020). Timing of the Diagnosis of Autism in African American Children. Pediatrics, 146(3), e20193629. https://doi.org/10.1542/peds.2019-3629.
Juárez, A. P., Weitlauf, A. S., Nicholson, A., Pasternak, A., Broderick, N., Hine, J., Stainbrook, J. A., & Warren, Z. (2018). Early Identification of ASD Through Telemedicine: Potential Value for Underserved Populations. Journal of autism and developmental disorders, 48(8), 2601-2610. https://doi.org/10.1007/s10803-018-3524-y.
Maenner, M. J., Warren, Z., Williams, A. R., Amoakohene, E., Bakian, A. V., Bilder, D. A., Durkin, M. S., Fitzgerald, R. T., Furnier, S. M., Hughes, M. M., Ladd-Acosta, C. M., McArthur, D., Pas, E. T., Salinas, A., Vehorn, A., Williams, S., Esler, A., Grzybowski, A., Hall-Lande, J., Nguyen, R. H. N., ... Shaw, K. A. (2023). Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years - Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2020. Morbidity and mortality weekly report. Surveillance summaries (Washington, D.C. : 2002), 72(2), 1-14. https://doi.org/10.15585/mmwr.ss7202a1.

Presenter Name: Alisa Zoltowski
Classification: Postdoc
PI: Cascio, Carissa

Insular connectivity in autistic and non-autistic development

Alisa R. Zoltowski, Michelle D. Failla, Fiona Wu, Molly Sullivan, Caitlin A. Convery, Brianna Lewis, Neil D. Woodward, Baxter P. Rogers, Carissa J. Cascio

Introduction: There is increasing evidence for altered interoceptive processing in individuals diagnosed with autism, compared to non-autistic individuals. At a neural level, there is some preliminary evidence of altered functional and structural connectivity patterns of interoceptive cortices in autism, though developmental patterns of these differences are unclear. To better examine the roles of autism and age in interoceptive connectivity patterns, we used a cross-sectional approach to examine interoceptive connectivity across individuals spanning a wide age range.

Methods: N=59 autistic individuals (ages 7-54) and N=71 non-autistic individuals (ages 7-51) completed a resting-state fMRI scan. From these resting state scans, we analyzed seed-based functional connectivity of primary interoceptive cortex in the posterior insula by hemisphere. We analyzed significant associations with age, group, and interoceptive self-reported experiences, as measured by the Body Perception Questionnaire.

Results: These findings suggest that adaptive interoceptive processing may indeed involve developmentally-refined efficiency in filtering interoceptive sensations. Differences between the autistic and non-autistic groups were minimal, with a single finding of left lateralized heightened connectivity between posterior insula and lateral occipital cortex. Thus, these findings shed light on important developmental shifts in interoceptive processing and converge with task-based findings suggesting intact primary interoceptive processing in autism.

Discussion: These findings suggest that adaptive interoceptive processing may indeed involve developmentally-refined efficiency in filtering interoceptive sensations. Differences between the autistic and non-autistic groups were minimal, with a single finding of left lateralized heightened connectivity between posterior insula and lateral occipital cortex. Thus, these findings shed light on important developmental shifts in interoceptive processing and converge with task-based findings suggesting intact primary interoceptive processing in autism.

Keywords (if any): Insula, Autism, Interoception

Presenter Name: Sudiksha Rathan Kumar
Classification: Undergraduate
PI: Ess, Kevin

Fighting the Fire: HIKESHI-associated Leukodystrophy

Sudiksha Rathan Kumar

Introduction: HIKESHI-associated leukodystrophy (HAL) is a lethal genetic condition with most patients dying in childhood. Patients display white matter hypomyelination, resulting in developmental delay, microcephaly, paraparesis, and high rates of fatality following febrile illness and infections. The disease is caused by homozygous HIKESHI missense mutations, resulting in loss of protein. HIKESHI is an evolutionary conserved and ubiquitous protein whose primary role appears to be during heat shock responses. When cells are exposed to physiological stressors such as heat or toxins, proteins misfold and aggregate resulting in cellular dysfunction and apoptosis. To prevent this, cells initiate a heat shock response where chaperone proteins refold damaged proteins and maintain homeostasis. The HIKESHI protein serves as an import carrier to the chaperone protein, HSP70, shuttling it into the nucleus as part of the heat shock response. We hypothesize lack of HIKESHI results in altered heat shock response resulting in the HAL phenotype.

Methods: Samples were collected from an affected homozygous patient, their non-symptomatic heterozygous parents, and healthy individuals and fibroblasts were generated. The fibroblasts were reprogrammed into iPSCs which were differentiated into neurons, oligodendrocytes, and cardiomyocytes. All the cell types were exposed to physiological stressors. Immunofluorescent staining and western blots for various protein markers were conducted. RNA Sequencing was performed to analyse expression levels under different conditions

Keywords (if any): Leukodystrophy