Northeastern University

Undergraduate Research Symposium

Date: Tuesday April 15th, 2025
Location: Hurtig Hall Room 115

A Showcase of Undergraduate Students' Work In Behavioral Neuroscience, Cognitive Psychology, and other Behavioral and Social Sciences

Sponsor: Brain Game Center for Mental Fitness and Wellbeing

Event Schedule:

1:00 - 1:30	Set up for Poster Session 1
1:30 - 3:00	Poster Session 1
3:00 - 3:30	Set up for Poster Session 2 + Refreshments
3:30 - 5:00	Poster Session 2
5:00 - 6:00	Reception and Poster Awards

Session Preparation

- **Double check your information**
  - Know your *Session* Number
  - Check your *Poster Number*
- **Arrive on time**
  - Check in ~15 minutes before your *Session*
  - Set up at the easel by your *Poster Number*
- **This is a professional development opportunity**
  - Professional attire strongly encouraged
  - A photographer will be present
  - Have fun and connect with faculty and trainees!

Awards

Behavioral Neuroscience Award
Recognizes outstanding and rigorous research that contributes to understanding brain function and behavior

Psychology Award
Recognizes exceptional rigorous and relevant research in psychology, including cognitive, social, and clinical psychology

Innovation Award
Recognizes research that introduces new ideas, methods, or technologies and demonstrates potential for advancing the field

Impact Award
Recognizes research that has potential to make a meaningful real-world impact through addressing social issues, public health, or other societal implications

Audience Choice Award
Selected by event attendees, this award recognizes a poster with the best engagement, clarity, and relevance to a broader audience

Resources - Poster Printing

Note: a standard research Poster size is typically ***48(w)x36(l)***
Links to poster templates: [1], [2]

1: Psychology Department
Nightingale Hall: head to NI 125 and Maribel Pereira can direct you to the printer. She can provide a USB for you to upload your poster to the printer (or you can bring your own) – so you will need to bring an adaptor if your computer does not have a USB port.

- Cost: Free
- Paper quality: Best
- Size limit: None

2: Makerspace
EXP: head to the Makerspace and the volunteers there can direct you to the printer. You must complete the EXP makerspace orientation training. They can provide a USB for you to upload your poster to the printer (or you can bring your own) – so you will need to bring an adaptor if your computer does not have a USB port.

- Cost: Free
- Paper quality: Okay (normal printer paper quality)
- Size limit: 2ft for either height or width (solution: print in two halves & tape together)

3: CAMD
Ryder Hall: head to the Media Center in Ryder Hall – this option is exclusively for CAMD students. If you are not a CAMD student but would like to print here, you will need to ask a CAMD student to come with you to give you access to the printer and walk you through the printing process.

- Cost: Under $10
- Paper quality: Okay (normal printer paper quality)
- Size limit: None

4: NU reprographics
Ell Hall: Visit this website for instructions: https://collegiatepress.com/northeastern/. Poster pickup is in the basement of Ell Hall – this option is very costly, so we recommend prioritizing one of the other options if/whenever possible.

- Cost: Over $50
- Paper quality: Best
- Size limit: None

5: Other options
Online: If ordered in advance, multiple websites have good poster printing. Spoonflower makes cloth posters for $30. Paper poster printing services can range from $60-$100. PhD Posters has pickup locations in Boston.

Session 1

1:30-3:00

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1. **Axonal Injury and Actigraphic Assessment of Sleep Disturbances Following Mild-Traumatic Brain Injury**
   Colette C. Chen, Emma M. Tinney, Mark Nwakamma, Goretti España-Irla, Lexie Hackman, Madeleine Perko, Jeremy Hwang, Alexandra Stillman, Timothy P. Morris

2. **Evaluating Inhibitory Control Using Digital Technology**
   Madison Mirro, Veronica Lekhtman, Lexi Boreck, Margo Laats

3. **Evaluating Visuospatial Working Memory Using the Simple Corsi Alien-Tapping Task**
   Brian Wang, Anna Ives, Mackinley Morgan, Siya Chhabra, Susanne Jaeggi, Aaron Seitz

4. **Exploring Variability in Perceptual / Cognitive Processes in Children with Autism Spectrum Disorder**
   Sophia Milla, Peige Wang, Lakshmi Kannan, Jennie Sanchez, Dr. Katherine Meltzoff, Dr. Aaron Seitz

5. **Impacts of Glyphosate Exposure on Traumatic Brain Injury**
   Shruti Kedharnath, Shreyas Balaji, Reyna Ahuja, Tochi Chukwuemeka, Deena Weiss, Kaashyap Balaji, Eva Bennet, Nevetha Vijayan, Ashwath Maheswari, Praveen Kulkarni, Ph.D., Craig Ferris, Ph.D.

6. **Investigating the Role of TCF4 in Interneuron Development**
   Chen-Yu Wang, Shang-Po Yang, Evan Keister, Hope Zamora, Rachel Parry, Amed Bekdash, Josephine Carscadden, Serena Benjamin, Artem Pustovid, Gord Fishell

7. **Multispectral Widefield Microscopy with Darkfield Illumination**
   Evan Yee, Kevin Mai, Kai Kumeno, Mark H. Cristino, Mohammad Abbas Yaseen

8. **Neural Circuitry of Inhibition: Tracing the ACC-IRt Pathway**
   Alexander Serper, Shijia Liu, Naamah Romano, Bernardo Sabatini

9. **Operational Categorization of Communicative Expressions from Non-Speaking Individuals with Profound Neurodevelopmental Disorders using In-Depth Caregiver Interviews**
   Tsambika Rizas, Kristina T. Johnson

10. **PASAT - Evaluating Working Memory using Digital Technology**
    Lilian O'Hara-Short, Miloslava Petridi, Conor Abramson-Tieu, Ella Szmania

11. **Performance Differences in Rule Switch Tasks: Tablets vs Laptops**
    Abigail Rizo-Rojas, Mirna Bonilla, Kashvi Mehta, Ruby Hibbert

12. **Tailoring Cognitive Training for Older Adults Aging with HIV**
    Casey Ames, Erika Yacharn; Morgan Gomez, Audrey Carrillo, Anja Pahor, Susanne Jaeggi, Aaron Seitz

13. **Telomere Length, Cortisol, Body Composition, Hemodynamics and Lifetime Participation in Dance: An Exploratory Analysis in 18-to-83-Year-Old Adults**
    Catarina Bettencourt, Jessica Salles Henrique, Inas Lalani, Saurav Nair, Nicole Lombardi, Emily Loane, Kiley Baker, Jared Ramer, Pierre Rouzier, Bruna Martins-Klein, Ravi Ranjan, Sherry Fung, Aston K. McCullough

14. **The cost-based balancing of the sampling-remembering tradeoff in a naturalistic task**
    Alireza Rozati, Candice Koolhaas, Zsuzsa Kaldy

15. **The Relationship between COPD and Panic Disorder on the basis of Central Medullary chemoreceptors**
    Michael Jeans, Lesley Ricci, Tarik Gouhier

16. **Using Visual Training Tasks to Develop PRL for Patients with MD**
    Anna Rose, Jaap Munneke, Susanne Jaeggi, Aaron Seitz

17. **Validating a short end musical expertise test**
    Summer Burt, Cloie Dobias

18. **Applying VADER sentiment analysis to understand experiences of dancing with and without music in adults**
    Arnibish Ray, Nandini Erodula, Anoushka Abroal, Kai Yi (Kaye) Han, Aston K. McCullough, Ph.D., M.S., M.A

Session 2

3:30-5:00

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19. **A Scoping Review Analytic Plan: Salivary Cortisol Reactivity to Stress in Pregnancy**
    Georgia F. Celestin, Maria Restrepo, Özlü Aran, PhD, Philip Espinola Coombs, Brie M. Reid, PhD

20. **A Study of The Mind and Music: The Spectro-Temporal Task**
    Madison Mirro, Claire Williamson, Ruihan Fang, Amalya Labell

21. **Analyzing Digitization Methods for Accurate fNIRS Head Mapping in Post-Stroke Aphasia**
    Pratham Khare and Priyansh Khare

22. **Artificial Phantasia: What the Virtual Mind Cannot Imagine**
    Morgan McCarty, Jorge Morales

23. **Associations Between Sleep, Hearing, and Age in Healthy Adults**
    Kerem Basoglu, Sia Shah, Bianca Braun, Bridget Carey, Jonathan Peelle

24. **Audio Visual Dual Attention Task: A Brief Overview**
    Stacy Abonce, Jeeya Bhutani, Jennifer Ritter, and Katherine Walsh

25. **Determining Whether Conception Depends on Overlap of Male and Female Circadian Rhythm**
    Chiara Blake, Sydney Aten, Shivani Howe, Clifford B. Saper

26. **Developmental Trajectories of Executive Functions**
    Elda Gobena, Zechun Zhao, Anja Pahor, Martin Buschkuehl, Aaron Seitz, Susanne Jaeggi

27. **Dichotic Sentence Identification Related to Musical Ability**
    Lauren Bernstein, Sebastion Silva, Laila Kibodya, Grace Rodrigue

28. **Effects of Arts-Based Training in Cognition and Gaze**
    Mackinley Morgan, Masha Vodyanyk, Susanne Jaeggi, Aaron Seitz

29. **Enhancing Speech Processing in Aging Adults Through an Attention-Based Music Intervention**
    Xinzhe He, Cloie Dobias, Maruša Laure, Susanne Jaeggi, Aaron Seitz

30. **Frequency Modulation Detection and Musical Expertise: A Cognitive Study**
    Tanvi Uttamchandani, Hannan Delil, Julie Tran, Quincy Dillard

31. **Functional Connectivity between Theory of Mind-Memory Regions in mPFC during Word Learning**
    Emily Cohen, Katherine Trice, Zhenghan Qi

32. **Impact of Active Video Games Exergames on Cognition in the Middle-Aged to Older Adults: A Systematic Review and Bayesian Meta-Regression of Randomized Controlled Trials**
    Marc Yangüez, Quentin Coppola, Esteban Sebastian Lelo de Larrea- Mancera, Chloe Lee, Jessica Fan, Eesha Gangal, Sierra Hall, Pankil Bhatt, Aaron Seitz, Susanne Jaeggi, Arthur Kramer, Amy Shirong Lu

33. **Inflammatory diet mediates the relationship between early life stress and inflammation in adolescents.**
    Caroline O. Glaser, Georgia F. Celestin, Özlü Aran, Bonny Donzella, Megan R. Gunnar, Brie M. Reid

34. **Kv6.4, a Kv Channel Subunit, Regulates PV Spiking and Short-Term Plasticity**
    Theresa Canty , Sanika Ganesh, Bernardo L. Sabatini

35. **Long-Term Neurobiological Implications of Adolescent Polysubstance Abuse**
    Deepti Athreya, Trisha Nelson, Bryce Axe, Trisha Musku, Shreyas Balaji, Anna Brettler, Saagar Shah, Gregorio Botelho, Praveen Kulkarni, Ph.D. & Craig Ferris, Ph.D.

36. **Mescaline-Induced Modulation of Fear and Reward Pathways: BOLD phMRI Study in Rats**
    Priya Rai, Noah Cavallaro, MS, David Akins, Rachel Utama, Anna Moore, Bryce Axe, Ashwath Maheswari, Richard Ortiz, PhD, Praveen P. Kulkarni, PhD, Craig F. Ferris, PhD

37. **Orthographic Serial Recall Task's Ability to Measure Children's Language and Reading Capabilities**
    Ananya Arvind

38. **Palmitoylethanolamide Causes Dose-Dependent Changes in Brain Function and the Brain/Plasma Lipidome**
    Kaashyap Balaji, Shreyas Balaji, Taylor J. Woodward, Ph.D., Emily Richter, Arnold Chang, Ph.D., Richard Ortiz, Ph.D., Ashley Ghaw, M.S., Nishit Singh, M.S., Bryce Axe, Ashwath Maheswari, Heather B. Bradshaw, Ph.D.; Praveen Kulkarni, Ph.D., Craig Ferris, Ph.D.

39. **Phonemic Serial Recall Task's Reliability and Applicability for Measuring Children's Language Capabilities**
    Janet Liu, Brynn Siles, Zhenghan Qi

40. **Receiving Social Support after Experiencing Early Life Adversity: Effects on Neuropsychobiology**
    Audrey Lynch

41. **Relationship Between Spatial Release and Musical Aptitude**
    Isabel Pregiato, Ariana Orellana, Grace Venezia

42. **Rest-Activity Rhythms and Cognition Following Mild-Traumatic Brain Injury**
    Jooahn Hwang; Emma M. Tinney, Mark Nwakamma, Goretti España-Irla, Lexie Hackman, Madeleine Perko, Colette C. Chen, Alexandra Stillman, Timothy P. Morris

43. **From Environmental Sounds to African Talking Drums: Accessible RMBIs**
    Josh West

44. **Sex differences and context specificity of vHIP-IL involvement in rat fear conditioning**
    Jasmin Patel, Mia Chen, Rylin Lubash, Sam Tuberman

45. **Sound Synthesis: A Creative Approach to Developing Rhythmic Stimuli for a MBI**
    Joshua Tochner

46. **Sugar Slay: A Gamified Machine Learning-based Decision Support Tool For Personalized Type 1 Diabetes Management**
    Vithika Pant, Nicholas Abrams, Sundararaman Rengarajan, Leanne Chukoskie

47. **The Speech Reception Threshold Task and its Relationship to Musicality**
    Dannya Burdier, Saachi Walia, Wesley Kim, Lucy Steiner

48. **Using Functional Connectivity to Evaluate a Deep Learning-Based Smart Swin Transformer Skull Stripping Algorithm for Preclinical fMRI**
    Rachel Utama, Sima Soltanpour, Md Taufiq Nasseef, Arnold Chang, Dan Madularu, Praveen Kulkarni, Craig Ferris, Chris Joslin

Full Abstracts

Session 1

1:30-3:00

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1. **Axonal Injury and Actigraphic Assessment of Sleep Disturbances Following Mild-Traumatic Brain Injury**

   Colette C. Chen, Emma M. Tinney, Mark Nwakamma, Goretti España-Irla, Lexie Hackman, Madeleine Perko, Jeremy Hwang, Alexandra Stillman, Timothy P. Morris

   Abstract: Individuals with mild traumatic brain injury (mTBI) can have persistent sleep disturbances over time. These sleep disturbances may be due to axonal injury in the left anterior internal capsule (ALIC), a region involved in sleep-wake states. Subjective sleep measures have been used to determine this relationship; however, objective measures have yet to be compared. We used diffusion weighted imaging to assess axonal injury and actigraphy to derive objective sleep measures. There was no significant correlation between objective sleep measures and axonal injury in the ALIC.

2. **Evaluating Inhibitory Control Using Digital Technology**

   Madison Mirro, Veronica Lekhtman, Lexi Boreck, Margo Laats

   Abstract: This project aims to develop digital tools to evaluate inhibitory control which can be impaired in multiple populations, including individuals with ADHD. In collaboration with the Northeastern Brain Game Center for Mental Fitness and Well-Being, we worked with a digital Flanker task. Participants observe five arrows and indicate which direction the middle arrow was pointing while ignoring the direction of the other arrows. It challenges their ability to disregard distractors. Our goal is to develop a normative dataset and establish reliability for this task to promote its free dissemination as a test to evaluate inhibition in real-world settings.

3. **Evaluating Visuospatial Working Memory Using the Simple Corsi Alien-Tapping Task**

   Brian Wang, Anna Ives, Mackinley Morgan, Siya Chhabra, Susanne Jaeggi, Aaron Seitz

   Abstract: This project aims to develop and disseminate digital tools to evaluate visuospatial working memory. In collaboration with the Northeastern Brain Game Center for Mental Fitness and Well-Being, we used a digital variant of the Complex Corsi Block-Tapping task, where participants observe a sequence of aliens popping up, perform a sorting task in-between, and then attempt to replicate the sequence in correct order. Their working memory performance is

quantified by the maximum sequence length they can accurately recall. We aim to develop a normative dataset to promote the task's dissemination as a test to evaluate memory-related abilities in real-world settings.

4. **Exploring Variability in Perceptual / Cognitive Processes in Children with Autism Spectrum Disorder**

Sophia Milla, Peige Wang, Lakshmi Kannan, Jennie Sanchez, Dr. Katherine Meltzoff, Dr. Aaron Seitz

Abstract: Autism Spectrum Disorder (ASD) is characterized by significant variability in social communication and cognitive processing, potentially influenced by differences in how the brain processes, stores, and manipulates information. Our research examines perceptual and cognitive processes that may underlie social communication abilities in ASD and how these differ across individuals. In collaboration with the Brain Game Center for Mental Fitness and Well-Being, we collected data through remotely administered auditory, visual, and cognitive tasks. Findings from this study will contribute to a deeper understanding of ASD phenotypes, informing targeted interventions to support cognitive and social development.

5. **Impacts of Glyphosate Exposure on Traumatic Brain Injury**

Shruti Kedharnath, Shreyas Balaji, Reyna Ahuja, Tochi Chukwuemeka, Deena Weiss, Kaashyap Balaji, Eva Bennet, Nevetha Vijayan, Ashwath Maheswari, Praveen Kulkarni, Ph.D., Craig Ferris, Ph.D.

Abstract: Glyphosate (Roundup), a globally used herbicide, has been linked to significant neurotoxicity in dopaminergic signaling throughout the brain, potentially contributing to the development of Parkinson's disease, a chronic neurodegenerative condition affecting over 10 million people worldwide. Over a 45-day period, animals were exposed to glyphosate, saline (negative control), or paraquat (gramoxone—positive control), subjected to repetitive-mild traumatic brain injury and examined using multimodal MRI. The findings are expected to provide valuable insights into the mechanisms by which two neurodegenerative risk factors, traumatic brain injury and herbicide exposure, synergistically contribute to dopaminergic signal loss and the potential onset of Parkinson's disease.

6. **Multispectral Widefield Microscopy with Darkfield Illumination**

Evan Yee, Kevin Mai, Kai Kumeno, Mark H. Cristino, Mohammad Abbas Yaseen

Abstract: Optical imaging in preclinical animals permits noninvasive, high-resolution, longitudinal characterizations of brain diseases like Alzheimer's disease and stroke. Widefield Optical Intrinsic Signal Imaging (OISI) is a powerful field of microscopy used for simultaneously imaging different regions of rodent brains. Currently, our method illumination is limited by the unwieldy and

inefficient liquid light guide. The goal of this project is to improve repeatability and efficiency by using an innovative method of illumination: using darkfield illumination with conical, "axicon" lenses and a specialized reflector.

7. **Investigating the Role of TCF4 in Interneuron Development**
Chen-Yu Wang, Shang-Po Yang, Evan Keister, Hope Zamora, Rachel Parry, Amed Bekdash, Josephine Carscadden, Serena Benjamin, Artem Pustovid, Gord Fishell
Abstract: Cortical interneurons play key roles in regulating cortical circuits, with their dysfunction frequently linked to neurodevelopmental and neuropsychiatric disorders. We investigated the role of transcription factor TCF4 in interneuron development; mutations of TCF4 cause Pitt-Hopkins syndrome, a severe neurodevelopmental disorder. We employed mouse genetics to ablate Tcf4 in cortical interneurons and conducted immunohistochemistry and single-cell genomics to evaluate its loss-of-function effect. Our data showed that TCF4 plays a key role in interneuron development. We found that TCF4 is regulated in a developmental-stage and cell-type-specific manner, conferring unexpected functional versatility to a constitutive, ubiquitous transcription factor to facilitate neuronal diversification.

8. **Neural Circuitry of Inhibition: Tracing the ACC-IRt Pathway**
Alexander Serper, Shijia Liu, Naamah Romano, Bernardo Sabatini
Abstract: Animals often encounter scenarios where a desire can be appeased through the partaking of an action. However, for each initiation of an action, a termination follows suit. The inability to stop an action is an integral part of multiple conditions, such as drug-abuse disorders and OCD. Thus, elucidating the neural network underlying the mechanism of termination may hold the key to understanding these conditions. Water-deprived mice have the natural desire to reduce their thirst and achieve homeostasis through the consumption of water. Through association learning, mice were trained to lick four times in response to a tone for a potential water reward. While the intermediate reticular formation (IRt) is known to control the motor aspect of tongue movement, it does not itself mediate the inhibition of licking. With the anterior cingulate cortex (ACC) being an integral part of decision-making, the ACC was investigated to see whether it controlled the inhibition of licking to the cue. Bilateral fibers were implanted into the ACC which allowed for the usage of blue light to activate GABAergic inhibitory neurons. It was found that pairing ACC inhibition with the tone during the behavioral task resulted in delayed inhibition of licking. As the ACC and IRt do not exhibit direct projections, immunohistology was used to visualize the complete neural network between the ACC and IRt. The ACC was found to have projections to the medial superior colliculus with the IRt having projections from the lateral superior colliculus, suggesting intra-superior colliculus communication within this neural circuit. Further research needs to be

conducted to fully visualize these intra-superior colliculus projections for a full image of the circuit. Additionally, it remains to be seen whether the inhibition affects cognition. Future studies are needed to determine whether the strength of inhibition will result in the decay of a belief.

9. **Operational Categorization of Communicative Expressions from Non-Speaking Individuals with Profound Neurodevelopmental Disorders using In-Depth Caregiver Interviews**

Tsambika Rizas, Kristina T. Johnson

Abstract: Communication from non- and minimally-speaking individuals with profound neurodevelopmental disorders (NDDs) is poorly understood. These individuals use a range of means to express themselves, including nonverbal vocalizations, canonical and idiosyncratic gestures, body movements, facial expressions, and augmentative and alternative communication (AAC) devices. The aim of this research was to develop a comprehensive framework of non-verbal communication that thoroughly described the range of communicative functions used by these individuals while minimizing the number of categories. This exploratory work analyzed 6 recorded caregiver-child interactions from a novel ~15-minute remotely-administered natural communication sampling paradigm (ROSCO; ~96 minutes of audio/video). Each caregiver rewatched the recorded ROSCO session with an examiner and was prompted to describe the meaning and social directedness of each of their child's communicative acts using their own words. These caregiver descriptions (~353 minutes of interview data) were then transcribed using automated speech recognition software (WhisperAI) and the description of each communicative act was manually isolated and analyzed. Initially, 34 different communicative functions were identified. Frequency analysis quantified the usage of each type of communication across sessions, and the framework was updated to resolve similarities and ambiguities of overlapping states by caregivers. For example, "frustration" and "annoyance," were merged, while "disengaged" was separated from "distracted" as these signified distinct states to most caregivers. Ultimately, 6 primary functional communication categories were determined – Requesting, Protesting/Rejecting, Commenting, Responding, Expressing Emotions, and Self-Directed Behaviors (e.g., stimming) – with additional subcategories highlighting common specific communicative intents, such as requesting help or expressing frustration, for a total of 24 subcategories. This framework is currently being evaluated for construct and content validity with new ROSCO data. It provides a structured approach for analysis of communication from non-speaking individuals with NDDs, acknowledging the nuance of non-spoken communication actions and behaviors and enabling more systematic monitoring of these individuals' communicative abilities over time.

10. **PASAT - Evaluating Working Memory using Digital Technology**
    Lilian O'Hara-Short, Miloslava Petridi, Conor Abramson-Tieu, Ella Szmania
    Abstract: This project aims to develop and disseminate digital tools to evaluate how we process and remember verbal information. In collaboration with the Northeastern Brain Game Center for Mental Fitness and Well-Being, we worked with a digital working memory updating task in which participants are asked to continuously add two numbers together while keeping in mind the most recent number that is hidden. Our goal is to develop a normative dataset and establish reliability for this task to promote its free dissemination as a test to evaluate memory-related abilities in real-world settings.

11. **Performance Differences in Rule Switch Tasks: Tablets vs Laptops**
    Abigail Rizo-Rojas, Mirna Bonilla, Kashvi Mehta, Ruby Hibbert
    Abstract: In collaboration with the Northeastern Brain Game Center for Mental Fitness and Well-Being, this project aims to work with the digital Rule Switch task, a well-established method to measure cognitive flexibility. In this task, participants are asked to correctly classify a stimulus by either its shape or color as the category switches. It challenges their cognitive flexibility by requiring participants to switch between rules and adjust their responses accordingly. Our goal is to develop a normative dataset and establish reliability for this task to promote its free dissemination as a test to evaluate cognitive flexibility in real-world settings.

12. **Tailoring Cognitive Training for Older Adults Aging with HIV**
    Casey Ames, Erika Yacharn; Morgan Gomez, Audrey Carrillo, Anja Pahor, Susanne Jaeggi, Aaron Seitz
    Abstract: Individuals aging with HIV are widely excluded from cognitive science studies. People in these communities regularly experience HIV associated neurocognitive disorders (HAND) with little to no resources from researchers. Cognition is identified as one of the top concerns among people aging with HIV, so this project aims to test if working memory training can help address cognitive deficits related to HAND. Here we will present data from an ongoing pilot study where we collect data on cognitive task performance and self-reported measures of experience and memory. Understanding individual differences in cognition is essential for developing effective personalized cognitive interventions.

13. **Telomere Length, Cortisol, Body Composition, Hemodynamics and Lifetime Participation in Dance: An Exploratory Analysis in 18-to-83-Year-Old Adults**
    Catarina Bettencourt, Jessica Salles Henrique, Inas Lalani, Saurav Nair, Nicole Lombardi, Emily Loane, Kiley Baker, Jared Ramer, Pierre Rouzier, Bruna Martins-Klein, Ravi Ranjan, Sherry Fung, Aston K. McCullough

Abstract: Physiological dysregulation (PD) reflects the cumulative effects of biological aging, and PD has been quantified using composite measures of biomarkers and biophysical signals. Participating in dance is positively associated with physiological health; however, little is known about the relationship between lifetime participation in dance and PD. The objective of this study was to test the relationship between a composite measure of PD and lifetime exposures to dance training among active, community-dwelling adults n=40 [female 80%(32), mean age: 42.5(19.3), years dance training: 0 to 56] completed all study activities. Cortisol levels were analyzed using fingernail samples obtained after 18–21 days of nail growth. Telomere length (TL), cortisol levels, blood pressure (BP), QTc ratio, heart rate (HR), percent body fat and resting metabolic rate (RMR) were measured. Principal components analysis (PCA) combined absolute TL, cortisol, BP, % body fat, and the QTc ratio into a composite measure of physiological health (CPH). Associations between CPH, age, and dance training experience were evaluated using Spearman's correlations and robust linear regression, with the significance level set a priori α=0.05. PCA yielded a CPH score that was positively associated with TL (λ = 0.41) and inversely associated with cortisol (λ = -0.06), systolic BP (λ = -0.55), diastolic BP (λ = -0.53), percent body fat (λ = -0.41), and QTc ratio (λ = -0.29). Years of participation in dance training were positively correlated with CPH scores after accounting for confounders, highlighting the possible health benefits of engaging in dance training throughout life.

14. **The cost-based balancing of the sampling-remembering tradeoff in a naturalistic task**

Alireza Rozati, Candice Koolhaas, Zsuzsa Kaldy

Abstract: In normal tasks, like grocery shopping, we choose between using external resources (such as a shopping list) or using internal resources (our memory). This phenomenon is called the sampling-remembering trade-off (Ballard et al., 1995; Van der Stigchel, 2020; Liang et al., 2025). We usually tend to balance between these two resources due to their costs: if checking the list gets harder, we rely more on internal memory; if remembering gets harder (like when there are so many items to remember), we check the list more often. If both checking the list and remembering is costly (the list is far away, and it has many unfamiliar items) then our sampling versus remembering behavior will be balanced in-between conditions where only sampling or remembering is costly. We tested this trade-off using a tablet-based "Shopping Game," where 27 participants selected 10 items from a virtual store. They could toggle between the store and a list but never see both at once. We manipulated cost across three conditions: Baseline (no delay), Sampling-delay (5-second delay to view the list), and Maintenance-delay (5-second delay when switching from list to store, requiring memory maintenance). We measured study time (how long

participants viewed the list) and memory usage (items remembered per trip). As expected, participants shifted toward greater memory reliance (higher study time and memory usage) in both delay conditions. Importantly, in the Maintenance-delay condition, where both sampling and remembering were costly, behavior balanced between the Baseline and Sampling-delay conditions. A post-hoc linear trend test (Baseline → Maintenance-delay → Sampling-delay) was significant for both measures: $F(1, 50) = 19.8$, $p < .001$ (study time) and $F(1, 50) = 4.95$, $p = .031$ (memory usage). An ongoing analysis of concurrent task-evoked pupillometry (Tobii Nano) will be used to corroborate this cost-based rebalancing of sampling versus remembering.

15. The Relationship between COPD and Panic Disorder on the basis of Central Medullary chemoreceptors

Michael Jeans, Lesley Ricci, Tarik Gouhier

Abstract: COPD and Panic Disorder (PD) are two diseases whose etiology involves central medullary chemoreceptors. The relationship between the two is fascinating, with 37% of COPD patients having PD as well, while the lifetime prevalence of PD is only 2.7%. This project explores the nature of the relationship between these two diseases by examining published literature to determine the room for a biological explanation (or multiple) for the relationship between these diseases.

16. Using Visual Training Tasks to Develop PRL for Patients with MD

Anna Rose, Jaap Munneke, Susanne Jaeggi, Aaron Seitz

Abstract: Macular degeneration (MD) is a condition where a person experiences central vision loss. To compensate, those with MD develop a preferred retinal locus (PRL), a location in their peripheral vision that performs tasks specific to central vision when directing eye movements. Our study aims to simulate central vision loss in participants with healthy vision while they complete visual training tasks using a gaze-contingent scotoma. Additionally, we aim to investigate the relationship between participants' behavior and neural activity through pre-training and post-training fMRI scans. By assessing changes in behavior, eye movement, and overall performance, we can better understand how central vision loss affects MD patients and adapt training tasks to support those who are slow or unable to develop a PRL.

17. Validating a short end musical expertise test

Summer Burt, Cloie Dobias

Abstract: The Musical Ear Test (MET) is widely used to assess musical perceptual abilities, which has been associated with enhanced cognitive functioning, particularly in executive functioning and auditory processing. However, the standard MET's 25-minute duration may induce fatigue, especially in certain

populations, potentially compromising assessment validity. This study aimed to validate a shortened version of the MET (18 items) against the full version (104 items) to determine if musical perceptual ability could be assessed more efficiently without sacrificing measurement integrity. Nineteen undergraduate students completed both versions of the MET in a two-week testing protocol. Paired samples t-tests revealed significant differences between the full and shortened versions ($p < .05$). Correlation analyses demonstrated weak but positive relationships between the versions for total scores ($r = 0.479$) and both subscales (melody: $r = 0.346$; rhythm: $r = 0.505$). While the significant differences between versions indicate they are not directly interchangeable, the positive correlations suggest the shortened MET captures some aspects of the construct measured by the full version. Future research should focus on increasing sample size to improve statistical power, further testing in diverse populations, and comparing alternative methods for abbreviating the MET to optimize both efficiency and validity. This work represents an important step toward creating more user-friendly tools for understanding how musical abilities relate to cognitive health.

18. **Applying VADER sentiment analysis to understand experiences of dancing with and without music in adults**

Arnibish Ray, Nandini Erodula, Anoushka Abroal, Kai Yi (Kaye) Han, Aston K. McCullough, Ph.D., M.S., M.A

Abstract: Purpose: To (i) characterize valence in qualitative transcripts about experiences dancing with and without music using VADER Sentiment Analysis (VSA) and (ii) identify if psychosocial wellness and motor behavior (MB) quality are correlates of VSA scores. Literature Review (Background): Engaging in dance is positively associated with mood, and recent studies show MB quality during dance may be associated with acute changes in mindfulness and mood. Additional research is needed to better understand the relationship between MB quality and psychosocial health. Methods: Participants [n=25, mean age: 46(19.5); female: 88%(22)] engaged in free-form dance (FFD) at self-determined light, moderate, and vigorous intensities for 5-minute bouts, repeated with and without self-selected music, in a laboratory. They wore 5 accelerometers (both wrists, ankles, and waist) while engaged in sitting, standing, walking, and FFD. They then completed a ≤10-minute unstructured qualitative interview reflecting on their dance experiences. VSA was used to extract compound, positive, negative, and neutral sentiment analysis scores from interview transcripts. Baseline self-reported psychosocial wellness and MB quality were also collected. MB quality was evaluated using a novel accelerometer-derived metric (i.e., “dance-like state” scores; DLS). VSA scores were regressed on MB quality and psychosocial wellness using robust linear regression. The significance level was set a priori at $\alpha=0.05$. Results and Discussion: VSA scores [Mean(SD)] in the sample were—positive 0.25(0.10), negative 0.03(0.02), neutral

0.72(0.10), and compound 0.58(0.18). Positive and neutral VSA scores were significantly associated with social participation [positive: t(19)=2.52, p=.02; neutral: t(19)=-2.96, p=.008] and variability (i.e., median absolute deviation) in DLS scores throughout the session [positive: t(19)=2.94, p=.008; neutral: t(19)=-3.46, p=.002]. Greater social participation in free-living and higher variability in MB were associated with more frequent positive valence and less neutral valence. Conclusion: Valence, as detected in brief qualitative interviews about experiences of dancing with and without music using VSA, was associated with social participation and DLS scores. VSA may be applied to transcripts to detect features related to health status and MB quality during dance; further research is warranted.

Session 2

3:30-5:00

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19. A Scoping Review Analytic Plan: Salivary Cortisol Reactivity to Stress in Pregnancy

Georgia F. Celestin, Maria Restrepo, Özlü Aran, PhD, Philip Espinola Coombs, Brie M. Reid, PhD

Abstract: Stress in human pregnancy is prevalent. When responding to stress, the body produces a glucocorticoid called cortisol that impacts many physiological processes such as inflammation and nutrient utilization. Pregnancy alters the human stress response and cortisol secretion may affect fetal development. While cortisol response throughout the day (diurnal) and when we wake up (cortisol awakening response) have been reviewed in pregnancy, less research has focused on cortisol reactivity to stressors. Studies have explored cortisol reactivity in pregnancy using the Trier Social Stress Task where impacts of variables like ethnic group, mental health, and gestational age were associated with maternal cortisol response to induced stressors such as amniocentesis, infant distress, or other stress-inducing tasks. Despite the wealth of literature exploring cortisol reactivity during pregnancy and the increased use of salivary cortisol measurement, changes in cortisol reactivity to a stressor across gestation and how this varies across individual characteristics remains unclear. We propose a scoping review to characterize the existing research, explore how salivary cortisol reactivity changes over the course of human pregnancy, and how responses may differ across race, ethnicity, and psychosocial variables. This review follows the Preferred Reporting Items for Systematic Reviews and Meta-analysis Protocols Extension for Scoping Reviews (PRISMA-ScR) guidelines. Covidence, a systematic review tool, is being used for title and abstract screening of 1,239 articles that met the following eligibility

criteria: participants were pregnant and gestational age was reported, there was an induced/experimental stressor, and cortisol reactivity was measured using saliva (both pre- and post-stressor). Next steps include full text review of relevant articles, data extraction, and synthesizing the data. The present scoping review will characterize cortisol reactivity during pregnancy to help understand physiological responsivity to stress, with implications for offspring health and development.

20. A Study of The Mind and Music: The Spectro-Temporal Task

Madison Mirro, Claire Williamson, Ruihan Fang, Amalya Labell

Abstract: The spectro-temporal modulation (STM) task is a tool for measuring spectro-temporal sensitivity, which is a combination of spectral and temporal cues. Strong STM performance has been linked to improved speech intelligibility, language learning, and musical ability. This study sought to discover if one's STM Threshold affects performance on measures of musical ability, which included the Full Length Musical Ear Test (MET) as well as on other measures including GoldMSI and eBMRQ. STM Threshold was tested by using a Portable Automated Rapid Testing system (PART). Within PART, participants performed a task which asked them to identify which of four sounds played was unique; the 33 participants completed 58 trials, including practice. Ultimately, this study will further add to an existing but limited body of research regarding STM and its relationship with musical ability. It more specifically addresses whether one's STM Threshold enables better at discrimination of differences of both simple melodies and rhythms.

21. Analyzing Digitization Methods for Accurate fNIRS Head Mapping in Post-Stroke Aphasia

Pratham Khare and Priyansh Khare

Abstract: Functional Near-Infrared Spectroscopy (fNIRS) is a technique that records brain activity but provides no information about brain structure. Variations in head sizes and shapes make accurately mapping fNIRS results on subject-specific head models essential. Our research aimed to test the accuracy and reproducibility of PATRIOT and FASTRAK digitizers for constructing 3D head models. We recorded multiple digitizer datasets and documented the role of metal interference. Trials showed that both devices were inconsistent and provided inaccurate reconstructions. These results align with reports from other teams, point to alternative fNIRS source localization methods, and inform future work on post-stroke aphasia fNIRS mapping.

22. Artificial Phantasia: What the Virtual Mind Cannot Imagine

Morgan McCarty, Jorge Morales

Abstract: In recent years, Large Language Models (LLMs) have become increasingly popular for many generalized tasks. LLMs, however, use a purely semantic approach towards tasks in which humans would combine verbal information with visual imagery. First, we describe a task that requires the use of visual imagery in which humans outperform state-of-the-art LLMs. Next, we design a "model-of-models" which attempts to integrate the necessary components to solve this task (and show its short-comings). Finally, we evaluate our model, and other existing models, against a "phantasia metric" which quantifies the difference between human and LLM performance in tasks that require visual imagery.

23. Associations Between Sleep, Hearing, and Age in Healthy Adults

Kerem Basoglu, Sia Shah, Bianca Braun, Bridget Carey, Jonathan Peelle

Abstract: Although sleep has been closely linked to many aspects of health, its associations with hearing health are not well understood. In the current study, 331 healthy adults aged 18-85 (45.1 ± 15.3 years; 156 females) self-reported sleep quality and hearing health using validated questionnaires. A composite score of hearing health was calculated and analyzed in relation to sleep quality. Initial findings show a moderate correlation between sleep quality and hearing health, suggesting that sleep could be a potential target for promoting hearing health across varying levels of hearing ability.

24. Audio Visual Divided Attention Task: A Brief Overview

Stacy Abonce, Jeeya Bhutani, Jennifer Ritter, and Katherine Walsh

Abstract: Executive functioning is the collection of cognitive processes, including working memory and divided attention, that allow for the planning and carrying out of goals. Processing auditory and visual information simultaneously is an essential part of this. Few cognitive tasks measure the simultaneous processing of auditory and visual information; therefore, the Audio Visual Divided Attention Task (AVDAT) is a significant advancement. The AVDAT measures a person's ability to simultaneously process auditory and visual information by presenting a series of numbers and letters aurally and visually, respectively, for recall. Previous research has shown that musicians are significantly more accurate in these types of tasks. The Musical Ear Test (MET) assesses musical abilities by presenting short musical phrases and asking participants to determine if two phrases are identical or different, focusing on melody or rhythm. This paper examines the performance of 34 college-age individuals in the Boston area on the AVDAT in conjunction with results from the MET and finds a high correlation between visual uncued trials from the AVDAT and the MET. However, these results were not observed with auditory AVDAT trials. Given these findings, it may be possible that individuals with high musical abilities have greater working memory and divided attention capabilities. It

should be explored further if visual divided attention and working memory abilities have a greater predictive capability of musical abilities than auditory abilities.

25. Determining Whether Conception Depends on Overlap of Male and Female Circadian Rhythm

Chiara Blake, Sydney Aten, Shivani Howe, Clifford B. Saper

Abstract: The World Health Organization (WHO) has stated that infertility is a global public health issue. Studies have shown that women who work odd hours (e.g. shift work) have been found to require fertility treatments when trying to conceive. Hence, gaining a better understanding of why this population of women (who experience chronic circadian misalignment) struggle to conceive, could help in the design and development of therapeutic strategies to improve fertility outcomes. This research project aims to explore how irregularities in male and female mouse circadian rhythms (in reproduction) affect the rate (and likelihood) of conception.

26. Developmental Trajectories of Executive Functions

Elda Gobena, Zechun Zhao, Anja Pahor, Martin Buschkuehl, Aaron Seitz, Susanne Jaeggi

Abstract: Executive Functions (EF) are fundamental cognitive domains that predict real-world outcomes including scholastic achievement. In collaboration with the Northeastern Brain Game Center, we implemented several digital EF and math skill assessments among children and adults of various ages (e.g. elementary, middle/high school, and college). These assessments capture EF dimensions such as working memory, cognitive flexibility, and inhibitory control. By examining data across different age groups and grades, we aim to provide insight into cognitive development across the lifespan, identifying patterns of growth and potential age and education-related changes. The relationship between cognitive abilities and academic achievement suggests that strong EF skills contribute to better educational outcomes. The investigation of this relationship is especially important for children from disadvantaged backgrounds who often experience disparities in educational quality, resources, and support systems. Therefore, our study also aims to investigate the potential impact of socioeconomic status on EF performance, identifying disparities that may contribute to differences in academic success. Understanding these relationships can inform interventions for cognitive and educational outcomes across diverse populations.

27. Dichotic Sentence Identification Related to Musical Ability

Lauren Bernstein, Sebastion Silva, Laila Kibodya, Grace Rodrigue

Abstract: The Dichotic Sentence Identification (DSI) task is a tool used to assess how well people process and distinguish sounds. This is crucial for communication, memory, and attention. This task involves listening to two sentences spoken at the same time, one in each ear, and identifying them from a set of written options. It plays a key role in studying auditory processing disorders, neurodegenerative diseases, and speech recognition in dementia. Research has shown that difficulties with central auditory processing can make it harder to understand speech, especially in places with background noise, and may be linked to conditions like Alzheimer's, ADHD, and traumatic brain injury (TBI). While studies have focused on older adults and those with significant hearing impairments, less is known about the risks for individuals with mild hearing loss. Musicians tend to show enhanced auditory processing, which could have implications for cognitive health. The DSI task has been found to be reliable in assessing auditory function and may even help predict dementia risk. Through the Portable Automated Rapid Testing system (PART), the DSI task is more accessible for research and clinical use. Understanding the connection between auditory processing and cognitive decline could lead to earlier detection and better interventions for neurodegenerative diseases.

28. Effects of Arts-Based Training in Cognition and Gaze

Mackinley Morgan, Masha Vodyanyk, Susanne Jaeggi, Aaron Seitz

Abstract: Tracking eye movements can be used to categorize types of attention, such as local (more detail-focused) and global (broader). In the current study, we quantified participants' eye movements during a drawing task as global or local. Participants completed the task before and after specialized training. We present a within-subject comparison of attentional strategies on the drawing task analyzing whether and how their attention type changed after training. Future directions include understanding how eye movements relate to drawing accuracy and performance in other perceptual tasks.

29. Enhancing Speech Processing in Aging Adults Through an Attention-Based Music Intervention

Xinzhe He, Cloie Dobias, Maruša Laure, Susanne Jaeggi, Aaron Seitz

Abstract: As we age, understanding speech in noisy environments becomes harder, leading to social isolation and cognitive decline. Even mild hearing loss increases the risk of Alzheimer's disease. Our project explores whether an attention-based music intervention ("SOM+A") can improve auditory and cognitive skills to help older adults process speech better. Since July 2023, we have developed and refined intervention mockups and audio materials, finalizing the first-week training module. This research could provide an accessible, music-based solution to support cognitive and auditory health, improving quality of life for aging populations.

30. Frequency Modulation Detection and Musical Expertise: A Cognitive Study

Tanvi Uttamchandani, Hannan Delil, Julie Tran, Quincy Dillard

Abstract: The study explores the relationship between musical expertise and auditory processing through the use of a Dichotic and Diotic Frequency Modulation (FM) Detection Task. FM detection reflects the ability to identify subtle pitch changes over time and is essential for understanding speech in noisy environments and processing complex auditory cues. Participants completed the FM task using the Portable Automated Rapid Testing (PART) system, which adapts task difficulty based on performance. In addition, participants completed multiple musicality assessments, including the Musical Ear Test (MET) and a 34-item Musicality Survey compiled from the GoldMSI, eBMRQ, and OLEN MSI. Analysis of participant performance revealed a significant correlation between FM Dichotic and Diotic thresholds, indicating shared cognitive demands between the two conditions. However, no strong correlation was observed between FM thresholds and musical training measures, suggesting that FM detection may rely on broader auditory or cognitive skills beyond those developed through musical experience. These findings challenge the assumption that musical training alone enhances all aspects of auditory perception and highlight the importance of task-specific skill evaluation. This research contributes to our understanding of how musical experience influences auditory cognition and offers new insights into the cognitive demands of FM detection tasks. The findings may have implications for auditory training programs, hearing research, and music education.

31. Functional Connectivity between Theory of Mind-Memory Regions in mPFC during Word Learning

Emily Cohen, Katherine Trice, Zhenghan Qi

Abstract: About 60% of autistic children have language impairments that often persist into adulthood, contributing to 40% of autistic adults facing unemployment and poor quality of life. Language skills are crucial for long-term vocational, educational, and social success, with vocabulary learning being one of the few areas that can improve over time. This fMRI study investigates the functional connectivity between theory of mind and memory regions in the mPFC during language acquisition in autistic individuals. By uncovering cognitive pathways that affect word learning and retention, this research aims to inform more effective interventions to address vocabulary deficits and improve outcomes.

32. Impact of Active Video Games Exergames on Cognition in the Middle-Aged to Older Adults: A Systematic Review and Bayesian Meta-Regression of Randomized Controlled Trials

Marc Yangüez, Quentin Coppola, Esteban Sebastian Lelo de Larrea- Mancera, Chloe Lee, Jessica Fan, Eesha Gangal, Sierra Hall, Pankil Bhatt, Aaron Seitz, Susanne Jaeggi, Arthur Kramer, Amy Shirong Lu

Abstract: The aging population is increasing globally, raising concerns about cognitive decline and dementia. Active Video Games (AVGs), or exergaming, combine physical activity with cognitive engagement and have shown small-to-moderate cognitive benefits in older adults. However, study heterogeneity and large publication bias raise concerns about their true effectiveness. This meta-analysis examines the impact of AVGs on cognition in middle-aged and older adults using Bayesian statistical methods and moderation analyses. A systematic review and meta-analysis included 61 studies from 6,041 articles (1996–2024), with 51 providing baseline and follow-up data. A Bayesian hierarchical random-effects model assessed overall cognitive effects, while moderation analyses examined population type, session duration, training frequency, intervention length, training modality (screen-based vs. VR), and game design (commercial vs. research-developed). Publication bias was addressed using Robust Bayesian Model-Averaging (RoBMA). Results indicated a small-to-moderate overall effect of AVGs on cognition, with moderate heterogeneity. However, strong publication bias was detected, and after correction, effect sizes decreased. Bayesian meta-regression identified weak moderation effects, with the strongest benefits seen in moderate (31–45 min, SMD = 0.64) and long (>45 min, SMD = 0.37) session durations, shorter programs (<10 hours, SMD = 0.55), VR-based exergames (SMD = 0.55), and research-developed games (SMD = 0.56). Cognitive effects were strongest for processing speed (SMD = 0.29), general cognition (SMD = 0.48), and inhibition (SMD = 0.43), while weaker for cognitive flexibility (SMD = 0.17) and working memory (SMD = 0.25). Despite promising findings, adjusting for publication bias reduced observed effects, emphasizing the need for further research. Standardizing AVG protocols and exploring long-term benefits could optimize cognitive interventions for aging populations. Overall, AVGs present a feasible, accessible, and enjoyable avenue for cognitive maintenance in aging populations, supporting the broader goal of promoting healthy aging and potentially reducing dementia risk.

33. Inflammatory diet mediates the relationship between early life stress and inflammation in adolescents.

Caroline O. Glaser, Georgia F. Celestin, Özlü Aran, Bonny Donzella, Megan R. Gunnar, Brie M. Reid

Abstract: Early life stress (ELS) is tied to heightened risk of negative health outcomes and mortality across the life span. Recent research has suggested chronic inflammation may be a key pathway from ELS to long-term adverse health outcomes. The present study aims to demonstrate the link between ELS,

in the form of previous institutionalization (PI), and inflammation. Additionally, it investigates whether the inflammatory potential of individuals' dietary habits, as indicated by scores on the Dietary Inflammatory Index (DII), informs this relationship. Using data from the Early Life Stress and Cardiometabolic Health in Adolescence Study (N = 191, aged 12 to 21 years, N = 95 PI), we utilized multiple regression to test the association between PI and three inflammatory cytokines (i.e., IL-6, CRP, TNF-α). We also tested whether DII mediated this association. Results revealed mean DII scores were significantly higher in PI adolescents than in their non-adopted counterparts, indicating more pro-inflammatory diets in PI adolescents. DII scores also significantly predicted levels of IL-6 and TNF-α, such that higher DII scores were associated with increased levels of these inflammatory cytokines. Further, the relationship between PI and TNF-α was mediated by DII scores. Taken together, these findings suggest that dietary habits in PI adolescents may play a key role in their heightened levels of inflammation compared to non-adopted adolescents, particularly for TNF-α.

34. Kv6.4, a Kv Channel Subunit, Regulates PV Spiking and Short-Term Plasticity

Theresa Canty , Sanika Ganesh, Bernardo L. Sabatini

Abstract: Parvalbumin (PV) neurons comprise the most common class of GABAergic neurons in the cerebral cortex. We studied the silent voltage ion channel subunit Kv6.4, encoded by Kcng4, in mouse PV neurons. Given that the expression of Kcng4 is highly PV-specific, we investigated whether this subunit could modulate the electrophysiological properties of PV neurons and cortical circuits generally. We used In situ analysis of M1 and S1 to quantify the co-expression of Pvalb and Kcng4, as well as compare these double-positive cells to Kcnb1. The in situ analysis demonstrated high co-expression of Kcng4 and Pvalb, and this co-expression was highest in the somatosensory cortex. There was not high co-expression of Pvalb/Kcng4+ and Kcnb1. Using transgenic lines, we investigated the expression of Kcng4 using a mouse line that expressed a marker for Kcng4 at two different ages. Transgenic lines revealed high expression of Kcng4 in the cortex and cerebellum. Comparing the transgenic lines at different ages, the onset of expression of Kcng4 aligns with that of Pvalb. We took whole-cell current-clamp recordings to determine the influence of Kv6.4 on PV physiological properties, and electrophysiological data demonstrated that Kv6.4 influences PV action potentials, specifically resulting in reduced AP half-width (HW) and reduced AP height. We also took paired whole-cell voltage-clamp recordings of pyramidal neurons connected to PV neurons to determine the effects of Kv6.4 on PV action potential shape and short-term plasticity of PV-pyramidal cell synapses. We found reduced paired-pulse depression, which suggests that there is reduced Ca2+ influx and a reduced probability of release of GABA due to the altered PV AP shape. These results reveal that Kv6.4 plays a distinctive role in modulating PV neuron

inhibition of excitatory activity. This is intriguing for its potential applications in diseases such as epilepsy.

35. Long-Term Neurobiological Implications of Adolescent Polysubstance Abuse

Deepti Athreya, Trisha Nelson, Bryce Axe, Trisha Musku, Shreyas Balaji, Anna Brettler, Saagar Shah, Gregorio Botelho, Praveen Kulkarni, Ph.D. & Craig Ferris, Ph.D.

Abstract: During adolescence, the brain undergoes a critical period of neuroplasticity, making it prone to developmental dysfunction. Exposure to psychoactive substances, such as tetrahydrocannabinol (THC) and alcohol, dramatically alter the way the brain develops, which subsequently affects cognition and behavior throughout adulthood. This study examines the longitudinal effects of simultaneous exposure to both substances through adulthood on neural structure and function, using a multimodal preclinical approach. We examined brain structure through the use of diffusion-weighted imaging (DWI) and voxel-based morphometry (VBM) analyses. To evaluate brain function, we utilized functional magnetic resonance imaging (fMRI) methodologies including the olfactory reward response and CO2 challenge, as well as resting-state functional connectivity (rsFC).

36. Mescaline-Induced Modulation of Fear and Reward Pathways: BOLD phMRI Study in Rats

Priya Rai, Noah Cavallaro, MS, David Akins, Rachel Utama, Anna Moore, Bryce Axe, Ashwath Maheswari, Richard Ortiz, PhD, Praveen P. Kulkarni, PhD, Craig F. Ferris, PhD

Abstract: Mescaline is a psychoactive alkaloid found in peyote, acting as a 5-HT2A/2C agonist and inducing hallucinations and euphoria through sensory system effects. Sensory perception, dominated by olfaction in rodents, processes and interprets external stimuli.

The goal of this study was to examine mescaline's effects on responses to olfactory stimuli in awake rats. Mountain lion urine and benzaldehyde were used to activate fear and reward pathways, respectively. Blood oxygen level dependent responses to these stimuli were measured with fMRI and resting state functional connectivity. This study aimed to address gaps in the current knowledge about mescaline and hallucinogens overall, by offering insight into the neurobiological mechanisms behind its sensory effects.

37. Orthographic Serial Recall Task's Ability to Measure Children's Language and Reading Capabilities

Ananya Arvind

Abstract: An orthographic serial recall task (OSRT) was constructed based on children's naturalistic language inputs in order to evaluate their sensitivity to statistical patterns in written language. This study aims to evaluate OSRT as a tool to measure children's real-world language capabilities by exploring whether

OSRT performance is related to concrete reading skills, including sight-reading and visual phonemic decoding. Characterizing OSRT and the skills it is associated with will provide additional context to its use as a tool for understanding individual differences in language processing and development, ultimately informing and optimizing individualized language instruction.

38. **Palmitoylethanolamide Causes Dose-Dependent Changes in Brain Function and the Brain/Plasma Lipidome**
Kaashyap Balaji, Shreyas Balaji, Taylor J. Woodward, Ph.D., Emily Richter, Arnold Chang, Ph.D., Richard Ortiz, Ph.D., Ashley Ghaw, M.S., Nishit Singh, M.S., Bryce Axe, Ashwath Maheswari, Heather B. Bradshaw, Ph.D.; Praveen Kulkarni, Ph.D., Craig Ferris, Ph.D.

Abstract: Palmitoylethanolamide (PEA) is an endogenous lipid-signaling molecule with analgesic properties, thought to activate CB1/CB2 receptors indirectly. While PEA has been shown to reduce inflammation peripherally, this study utilized BOLD neuroimaging post-acute PEA administration to determine effects on the CNS. PEA caused global changes in rat brain activity in a dose-inverse manner. Lipidomics analysis further revealed widespread, yet variable changes in other endocannabinoid lipid-signaling molecules, including endocannabinoids AEA and 2-AG. Variations in brain activity and lipid-signaling molecules by region suggest that PEA has multiple molecular targets and affects distinct signaling pathways, highlighting the need for further research on the endocannabinoid system.

39. **Phonemic Serial Recall Task's Reliability and Applicability for Measuring Children's Language Capabilities**
Janet Liu, Brynn Siles, Zhenghan Qi

Abstract: Previous research has linked children's statistical learning performance with their real-world language learning capabilities as measured by a phonemic serial recall task (PSRT); however, the task's reliability and relationship with language skills remain to be evaluated. This study aims to investigate the task's test-retest reliability and its relationship with language skills including comprehension and phonological awareness in children ages 6-9. These findings will give us a better idea of the task's applicability as a tool to measure naturalistic language capabilities in children. Ultimately, this tool would help optimize the approaches used for characterizing individual differences in language development.

40. **Receiving Social Support after Experiencing Early Life Adversity: Effects on Neuropsychobiology**
Audrey Lynch

Abstract: Early life adversity (ELA) is the exposure to negative experiences during childhood or adolescence including war, malnourishment, physical, emotional, or sexual abuse, and neglectful parenting behaviors. Children raised under these circumstances show increased risk for poor health outcomes such as anxiety, depression, PTSD, substance abuse, and self harm. Rodents provide researchers with a model organism for examining the in depth impacts of stress on hormones and behavior. Maternal separation (MS) is a well-validated model used to induce ELA and is known to increase anxiogenic behavior in male adolescent rats. How and if social support mitigates such negative impacts of ELA is unknown, however. In this study, rats experienced one week of restraint stress during adolescence and were or were not helped by another rat. Blood samples were collected to measure corticosterone, and anxiety-and-depression-like behaviors were analyzed. Preliminary data reveals that rats who were not helped demonstrate greater anxiety-like behavior. Also, MS reared rats who were not helped show greatest motivation for a palatable reward.

41. Relationship Between Spatial Release and Musical Aptitude

Isabel Pregiato, Ariana Orellana, Grace Venezia

Abstract: The spatial release from masking (SRM) task is a measure of speech recognition in noisy environments. This study investigates the relationship between SRM and musical aptitude. Participants performed a spatial release task that required them to differentiate a command amidst simultaneous, competing voices from collocated or spatially separated locations. Musical aptitude was assessed using the Musical Ear Test (MET) and the GoldMSI. The results indicated a positive correlation between MET scores and GoldMSI scores, suggesting a link between musical perceptual skills and general musical training. However, the correlation between SRM performance in the collocated condition and MET scores was weak and non-significant. These findings suggest that while musical training is associated with stronger auditory skills, its impact on SRM may be complex and require further investigation. The implications of these findings extend to the development of auditory training programs aimed at improving speech perception in noise, particularly those with hearing impairments or auditory processing disorders.

42. Rest-Activity Rhythms and Cognition Following Mild-Traumatic Brain Injury

Jooahn Hwang; Emma M. Tinney, Mark Nwakamma, Goretti España-Irla, Lexie Hackman, Madeleine Perko, Colette C. Chen, Alexandra Stillman, Timothy P. Morris

Abstract: Persistent cognitive deficits have long been associated with traumatic brain injury, even in mild cases. Individuals frequently experience difficulties returning to their daily routines, quoting disturbances in sleep and waking behavior. Such fragmentation of rest activity rhythm (RAR) has been identified as a marker for cognitive impairment. Using non-invasive actigraphy, we captured

intradaily variability (IV) and interdaily stability (IS), both standard measures of RAR for patients with mild TBI. Baseline cognitive performance was compared to IV and IS using GGIR in R. No significant relationships were found between IV/IS in relation to any of the cognitive tests performed at baseline.

43. From Environmental Sounds to African Talking Drums: Accessible RMBIs

Josh West, Cloie Dobias, Josh Tochner

Abstract: I have been working as an audio engineer while simultaneously taking classes for the last two years. My initial goal was to transform everyday sounds into stimuli mimicking these African talking drums for our research. I was able to sample environmental sounds such as rain, crosswalk beeps, and knocking on a door. I used my iPhone to capture all of these sounds and planned on processing them in a Digital Audio Workspace at the recording studio I work at. However, high client volume and overall limited studio availability hindered my ability to manipulate any of the sounds. This experience provided me with the very practical limitation of access to equipment or technical resources needed in RMBI research. These easily accessible environmental sounds would change the way we gather stimuli in this type of research. While accessibility to equipment proved to be a constraint, there are relevant implications for future research. Looking to the future, researchers would have the advantage of minimal-resource approaches.

44. Sex differences and context specificity of vHIP-IL involvement in rat fear conditioning

Jasmin Patel, Mia Chen, Rylin Lubash, Sam Tuberman

Abstract: Post-Traumatic Stress Disorder (PTSD) disproportionately affects women, yet the underlying neural mechanisms contributing to this sex difference remain underexplored. Darting, a sexually dimorphic fear response seen 4x more in female rats, has been identified as context-dependent. This study investigates ventral hippocampal (vHip) inputs onto the infralimbic cortex (IL) involvement in integrating contextual information to drive darting behavior. Rats undergo Pavlovian fear conditioning and c-fos immunohistochemistry to quantify differences in vHIP activation. Understanding the neural circuitry that underlies darting in rodents may provide insights into sex-specific risk factors, pathology, and treatment of PTSD and other highly contextualized trauma-related disorders.

45. Sound Synthesis: A Creative Approach to Developing Rhythmic Stimuli for a MBI

Joshua Tochner

Abstract: The Rhythm Project is a Music based intervention (MBI) focused on rhythm in a cognitive framework. MBIs are recognized as important tools for preventing or rehabilitating cognitive functions associated with Alzheimer's

Disease and Related Dementias. The primary intervention is a cognitively complex rhythm-based MBI employing “naturalistic” conversational drumming approaches. Participants will learn probabilistic sequences based upon musical grammars, spatially map sounds on “virtual instruments”, and practice call-response behaviors. My job has been to develop rhythmic stimuli, specifically drum samples, for the “virtual instruments”. The samples consist of three categories, low, tone, and slap. My poster will be focused on the process, problems, and importance of the stimuli synthesis for this project. This research will provide fundamental information to motivate future studies addressing efficacy of rhythm-focused MBIs as tools for healthy cognitive aging, which is an important step towards the long-term goal of testing the extent to which rhythm-focused MBIs cognitively engage patients with mild cognitive impairment and ADRD.

46. Sugar Slay: A Gamified Machine Learning-based Decision Support Tool For Personalized Type 1 Diabetes Management

Vithika Pant, Nicholas Abrams, Sundararaman Rengarajan, Leanne Chukoskie

Abstract: Managing Type 1 Diabetes (T1D) requires continuous monitoring and personalized adjustments to maintain healthy blood glucose levels, which are essential for long-term health and well-being. Recent advances in mobile health technologies offer new opportunities to support T1D management by integrating real-time data and providing dynamic, user-centered decision-making tools. This paper presents Sugar Slay, an innovative mobile application that gamifies T1D care by combining physiological data from wearable fitness trackers with continuous glucose monitoring (CGM) systems. One of the app’s core features is its predictive modeling capability. We employ a Sequence-to-Sequence Bi-directional Long Short-Term Memory (Seq2Seq BiLSTM) model to synthesize users’ physiological and glucose data, generating personalized blood glucose trend predictions up to two hours in advance. These predictions empower users to make proactive, data-informed decisions to maintain glucose stability. In addition to its technical functionality, Sugar Slay is grounded in user-centered design principles. We conducted extensive user research—including need-finding interviews and iterative usability testing—with individuals managing T1D to ensure the app’s relevance, usability, and effectiveness. Insights from this research informed both the system architecture and interaction design, allowing us to better align the app with users' daily routines, challenges, and goals. To further support engagement and habit formation, Sugar Slay incorporates gamified features such as personalized challenges, achievement-based rewards, and social competition. By delivering real-time insights alongside motivational features, the application aims to enhance self-management behaviors and ultimately improve health outcomes for individuals with T1D.

47. The Speech Reception Threshold Task and its Relationship to Musicality

Dannya Burdier, Saachi Walia, Wesley Kim, Lucy Steiner

Abstract: The Speech Reception Threshold (SRT) task is a critical tool for assessing auditory processing capabilities, particularly in understanding speech perception across varying volume intensities. This study investigated the relationship between musical aptitude and speech reception performance using the Portable Automated Rapid Testing (PART) system. Participants completed an SRT task on a digital platform, with trials varying in difficulty based on volume levels. Concurrently, participants were assessed using multiple music-related questionnaires, including the Musical Ear Test (MET) and musicality surveys. A Pearson correlation analysis examined the association between SRT thresholds and full MET total scores. Results revealed a weak positive correlation ($r = 0.287$, $p = 0.100$), suggesting a subtle trend where individuals with higher musical aptitude demonstrated slightly poorer speech reception performance. However, this relationship was not statistically significant, highlighting the complex nature of auditory processing and musical ability. The findings contribute to the ongoing research exploring the potential cognitive and perceptual benefits of musical training on auditory processing skills.

48. Using Functional Connectivity to Evaluate a Deep Learning-Based Smart Swin Transformer Skull Stripping Algorithm for Preclinical fMRI

Rachel Utama, Sima Soltanpour, Md Taufiq Nasseef, Arnold Chang, Dan Madularu, Praveen Kulkarni, Craig Ferris, Chris Joslin

Abstract: Accurate skull stripping is critical for analyzing brain functional connectivity (FC) in functional MRI (fMRI). SST-DUNet, a deep learning-based automated skull stripping framework, combines a dense 3D U-Net with a Smart Swin Transformer (SST) feature extractor. Skull stripping is often a major bottleneck in preclinical fMRI analysis, making the use of SST-DUNet, which outperforms existing automated methods and closely matches manual accuracy while being significantly faster, a major advantage. To evaluate its impact on downstream analysis, seed-based correlation maps and group independent component analysis (ICA) results were compared across multiple skull-stripping methods, including RATS, SHERM, 3D U-Net, and RS-2 Net, using manual extraction as the ground truth. Findings show a near-perfect correlation (Pearson $R > 0.99$) between SST-DUNet and manual skull stripping, confirming that key functional networks are preserved while preprocessing time is significantly reduced. Thus, the FC results present SST-DUNet as a strong candidate for replacing manual skull stripping for preclinical fMRI.