

Research Portfolio

Genetics, Cognition, and Neurodevelopmental Disorders

Joey W. Trampush, Ph.D.

Department of Psychiatry and the Behavioral Sciences, USC Keck School of Medicine

Assistant Professor of Psychiatry and the Behavioral Sciences

February 4, 2025

Hello ...

Research Focus Areas

Core Research Domains

- Neuropsychology
- Child, Adolescent, and Adult ADHD Diagnosis & Treatment
- Psychiatric Genetics
- Cognitive Genomics
- Neurodevelopment

Methodological Expertise

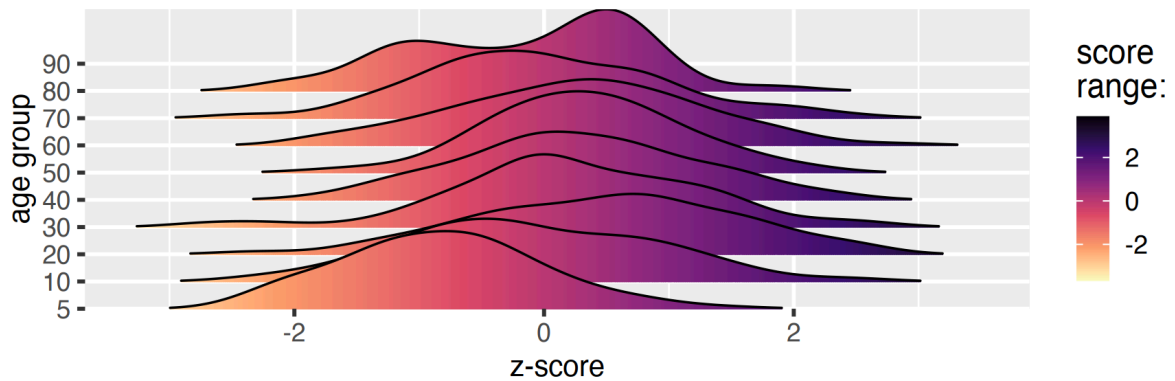
- Genome-wide Association Studies (GWAS)
- Systematic Reviews
- Clinical Guidelines Development
- Neuropsychological Assessment
- Data Science
- Language Learning Models (LLMs)

RDoC Cognitive Systems GWAS (R03 MH123787)

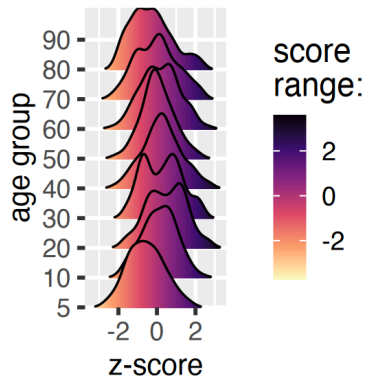
Project Goals:

- Investigate latent molecular genetic architecture of working memory
- Use existing COGENT consortium data
- Identify genome-wide allelic variation
- Focus on causal, not just correlational relationships

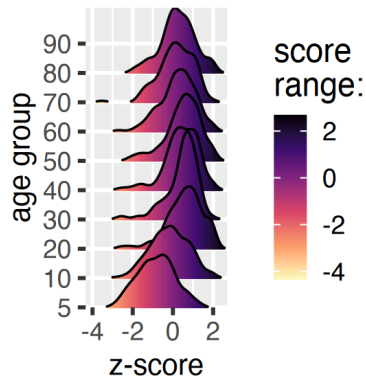
WM factor



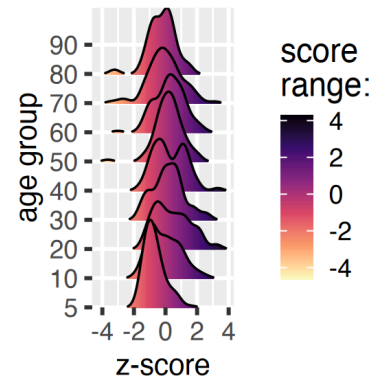
dot counting



nBack2



nBack1



Early Development & Brain Function (R01 DK110793)

Collaboration with CHLA

Research Focus:

- Impact of early feeding practices
- Human milk oligosaccharides (HMOs)
- Effects on obesity development
- Brain development trajectories
- Longitudinal design
- Multi-modal assessment
- Developmental outcomes
- Clinical implications

AHRQ Adult ADHD Review Project (75Q80120D00009)

Co-funded by the FDA

Study Overview

Three key questions:

1. WHERE to stimulate in hippocampus?
2. WHEN during memory tasks?
3. HOW (stimulation parameters)?

Data Science

Focus on reproducible research

- R, some Python
- Quarto, Typst

GitHub Repos

- Adult templates for neuropsych
- Adult templates for neuropsych
- Adult templates for neuropsychneurotyp-forensic
- Neuropsych reports

Large-Scale Biobank Data

- UK Biobank
- ABCD Study
- 23andMe
- Many others

Language Learning Models (LLM)

Application to Neuropsychological Evaluation

Developing LLM to process neurocognitive and behavioral data from evaluations that otherwise take several hours.

- Summarization using Chain of Density

Integration & Clinical Impact

How these projects work together:

1. Genetic architecture → Treatment targets
2. Early development → Prevention strategies
3. Clinical guidelines → Evidence-based care
4. Translational potential → Improved outcomes

Future Directions

Research Goals:

- Expand genetic findings
- Identify biomarkers
- Develop interventions

- Improve diagnostics

Clinical Applications:

- Personalized medicine
- Early intervention
- Treatment optimization
- Outcome prediction

Thank you!!