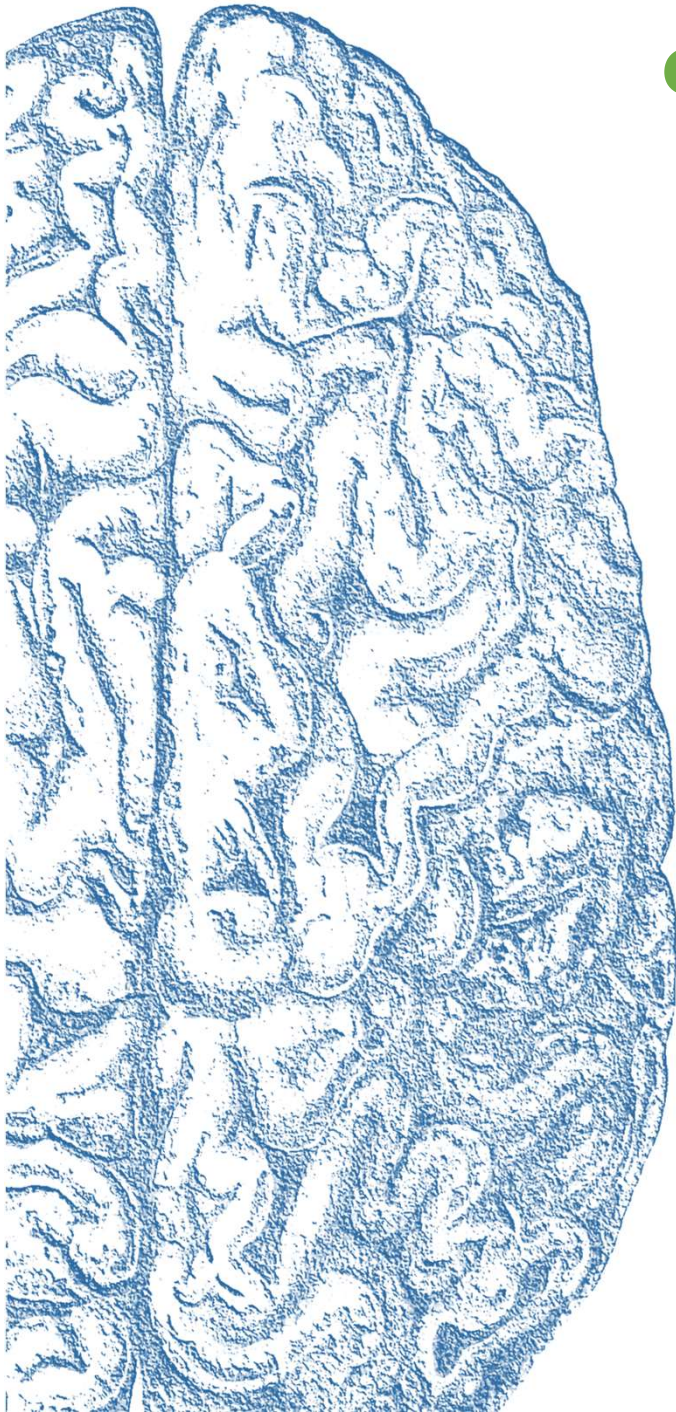




DEPARTMENT OF PSYCHIATRY
**RESEARCH HALF DAY
& RESEARCH RESOURCES REVUE**

**October 5, 2021
Pittsburgh, PA**





DEPARTMENT OF PSYCHIATRY

**RESEARCH HALF DAY
& RESEARCH RESOURCES REVUE**

POSTER MAPS

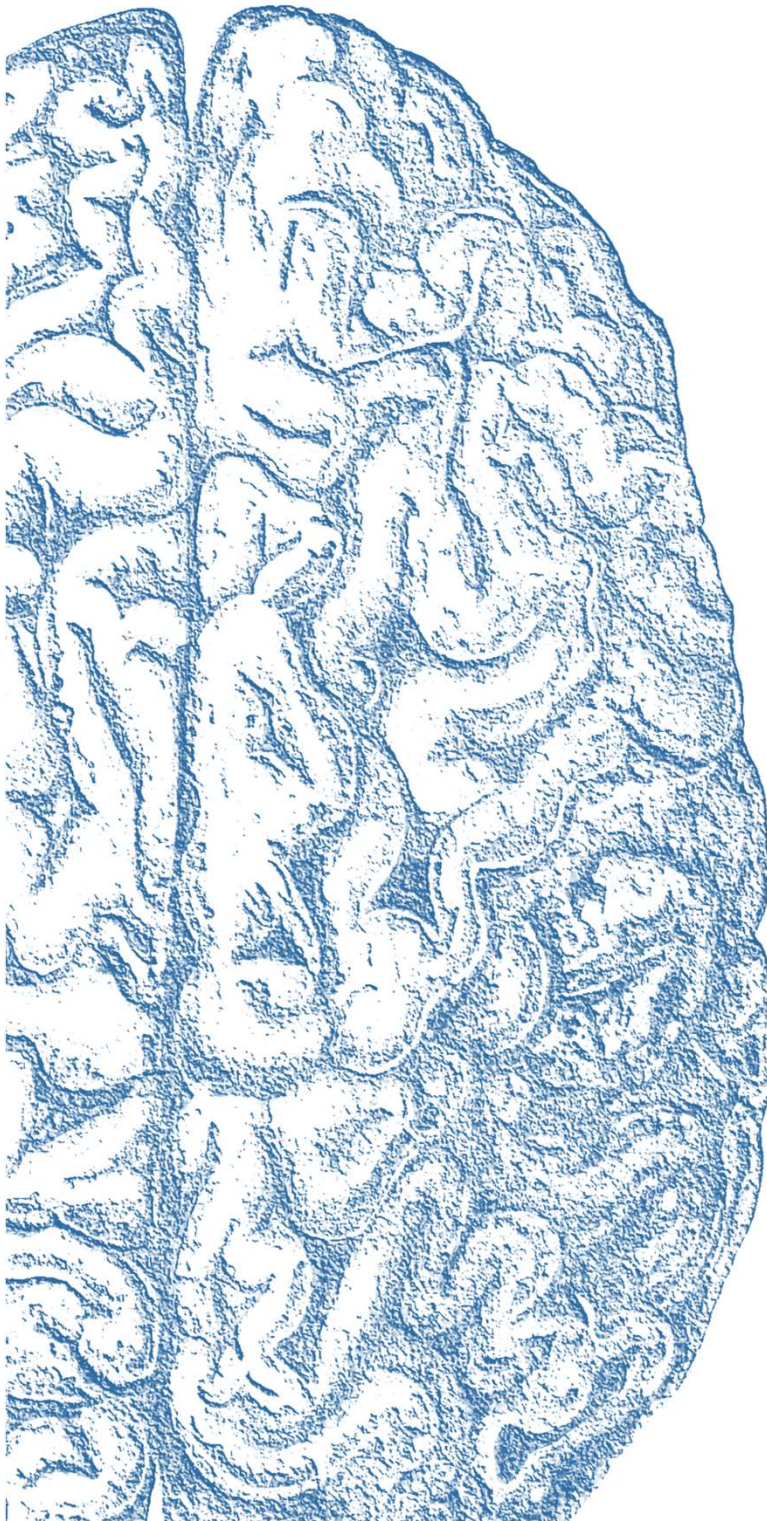
1ST FLOOR

**BALLROOM A
POSTERS 1-42**

2ND FLOOR

**GOLD ROOM
POSTERS 43-54**

**BALLROOM B
POSTERS 55-96**



MINI BREAKFAST BUFFET

ENTRANCE TO
DOWNSTAIRS
BALLROOM



POSTER DISCUSSANTS
REGISTRATION

CHAIR

CHAIR

SOFA

RECEPTION DESK

POSTER PRESENTERS
REGISTRATION

POSTER PRESENTERS
REGISTRATION

ATTENDEE
REGISTRATION

ATTENDEE
REGISTRATION

University Club Downstairs Lobby

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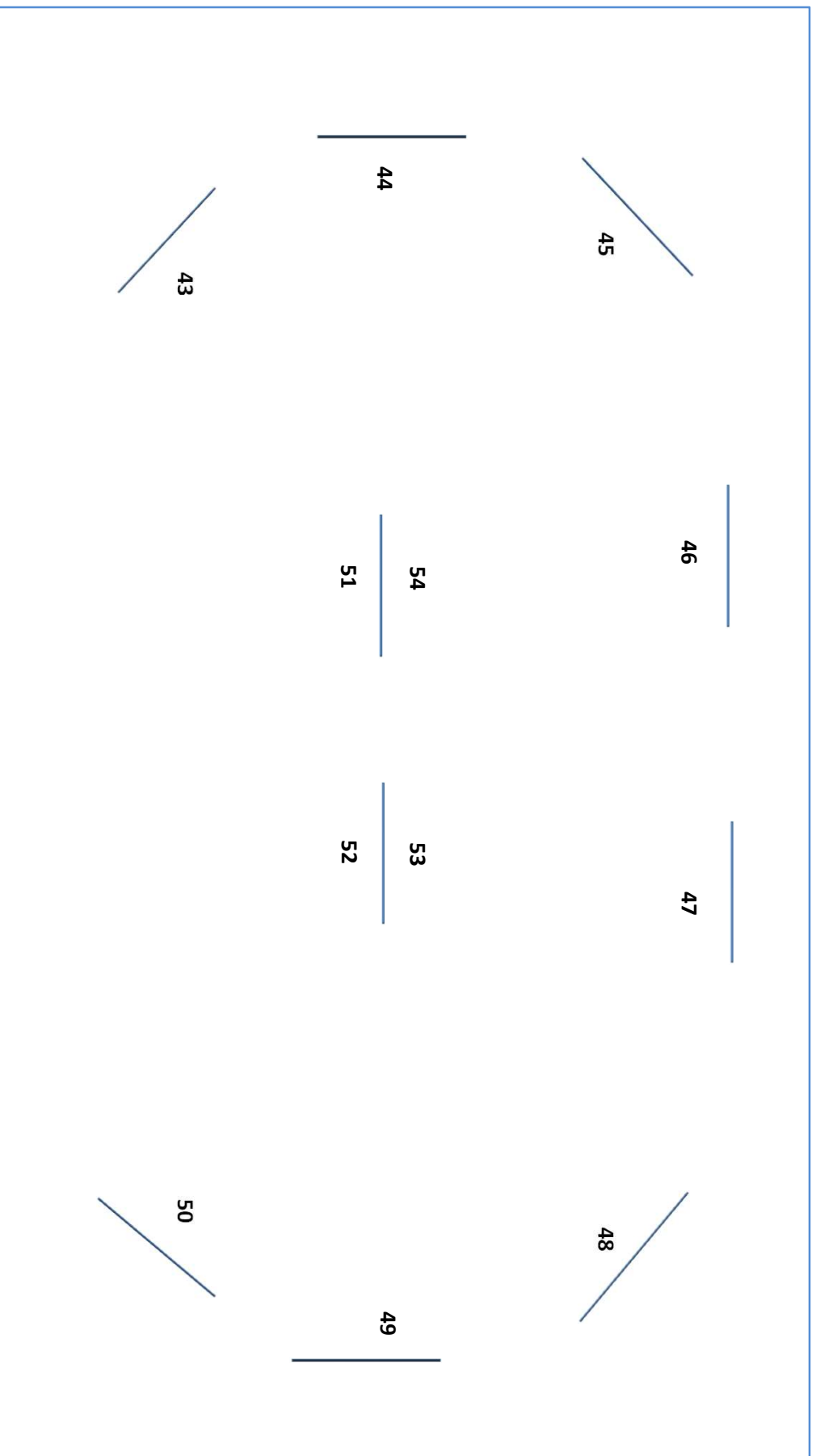
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1
Ballroom
Entrance

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**2021 Research Half Day and Research Resources Revue
University Club – 1st Floor, Ballroom A
Posters 1-42**



**2021 Research Half Day and Research Resources Revue
University Club – 2nd Floor, Gold Room
Posters 43-54**

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Ballroom B
Entrance

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2021 Research Half Day and Research Resources Revue
University Club – 2nd Floor, Ballroom B
Posters 55 - 96

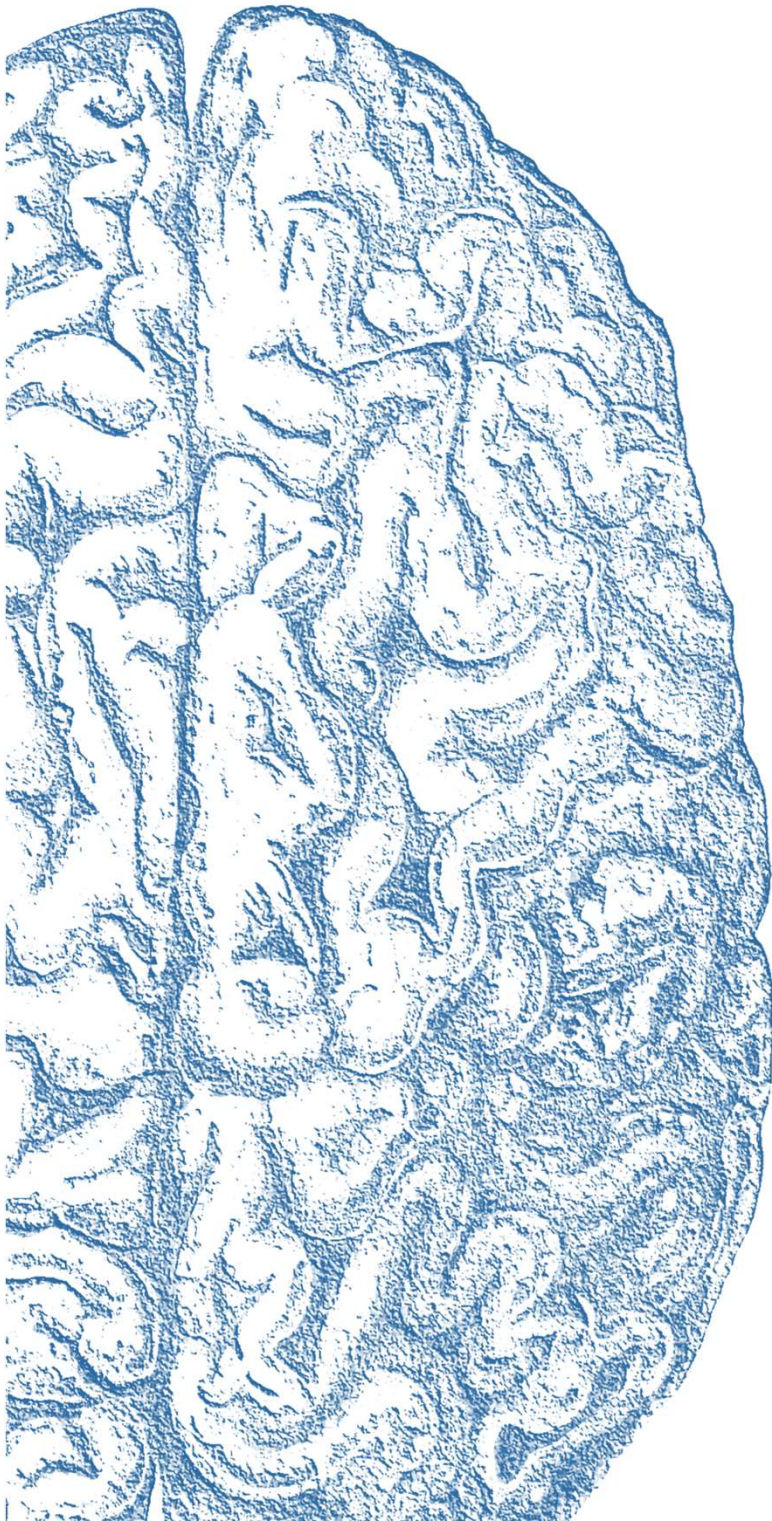


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64	BALLROOM B, 2ND FLOOR	Runk	Ashlyn		Cognitive Correlates of Everyday Functioning in a Sample of Predominantly Low-Income, Community Dwelling, African-American Older Adults
65	BALLROOM B, 2ND FLOOR	Salisbury	Elisabeth	PhD	Physiologic indices of withdrawal in opioid-exposed newborn
66	BALLROOM B, 2ND FLOOR	Sammon	M. McLean		Associations among negative social media experiences, depressive symptoms, and SITBs in young adults
67	BALLROOM B, 2ND FLOOR	Satz	Skye	BS	Differential resting-state network connectivity is associated with memory consolidation processes in individuals with depressive disorders
68	BALLROOM B, 2ND FLOOR	Schoonover	Kirsten	PhD	Actin Regulation and Energy Production in Layer 3 Prefrontal Cortex in Schizophrenia

69	BALLROOM B, 2ND FLOOR	Schumer	Maya	BS	Amygdala, Orbitofrontal, and Medial Prefrontal Activation During Implicit Facial Emotion Processing Distinguish Young Adults With Low and High Levels Of Negative Urgency From Those With Bipolar Disorder
70	BALLROOM B, 2ND FLOOR	Scott	Madeline	PhD	Altered 12 hour rhythms in the dorsolateral prefrontal cortex of subjects with schizophrenia
71	BALLROOM B, 2ND FLOOR	Sheehan	Haley		Acute Alcohol Consumption's Effects on Subsequent Same Day Sleep Characteristics: A Multi-Method Examination
72	BALLROOM B, 2ND FLOOR	Sheth	Shreya	MA	Negative Affect as a Predictor of Prospective Suicide Attempts in Borderline Personality Disorder
73	BALLROOM B, 2ND FLOOR	Sheynblyum	Miriam	BA	Feasibility Study to Train Speech-Language Pathologists to Work with Autistic Children
74	BALLROOM B, 2ND FLOOR	Skiba	Justin		Expressive Suppression and Anxiety in Children with Parental Cancer
75	BALLROOM B, 2ND FLOOR	Sklar	Alfredo	MD	Load-Dependent Functional Connectivity Deficits During Visual Working Memory in First-Episode Psychosis
76	BALLROOM B, 2ND FLOOR	Smith	Dana	BA	Effects of chemogenetic manipulation of VTA to amygdala projection on cocaine cue associative learning
77	BALLROOM B, 2ND FLOOR	Son	Sang Joon	MD	Accelerated brain aging using an established machine learning model: clinical application for the detection of cognitive function and amyloid status in the elderly
80	BALLROOM B, 2ND FLOOR	Stepp	Stephanie	PhD	The STEADY Study
81	BALLROOM B, 2ND FLOOR	Stern	Harrison		Objective and Subjective Physical and Mental Health Benefits in Older Adults with Cardiometabolic Risk After a Diabetes Prevention Program-Based Lifestyle Intervention
94	BALLROOM B, 2ND FLOOR	Stetten	George	MD, PhD	Visualization and Image Analysis (VIA) Lab
82	BALLROOM B, 2ND FLOOR	Stiller	Ashley		Pittsburgh Girls Study Data Set
83	BALLROOM B, 2ND FLOOR	Stringfield	Sierra	PhD	Impact of THC on delay-phase neuronal activity during a working memory task
84	BALLROOM B, 2ND FLOOR	Thurston	Rebecca	PhD	Study of Women's Health Across the Nation (SWAN)
85	BALLROOM B, 2ND FLOOR	Tracy	Eunjin	PhD	Homeostatic sleep regulation and circadian rhythmicity are intact in older adults with insomnia
86	BALLROOM B, 2ND FLOOR	Tsypes	Aliona	PhD	Delay Discounting in Suicidal Behavior: Myopic Preference or Inconsistent Valuation?
87	BALLROOM B, 2ND FLOOR	Vanwoerden	Salome	PhD	Autonomic nervous system response to conflict in youth interact with parents' supportive and non-supportive responses to predict borderline personality disorder symptoms
88	BALLROOM B, 2ND FLOOR	Wears	Anna	BA	Concordance of Model-Based Reinforcement Learning in Mothers and Daughters: The Impact of Maternal History of Major Depression
89	BALLROOM B, 2ND FLOOR	Westbrook	Cecilia	MD, PhD	Neural mechanisms of mindful disengagement from worry
90	BALLROOM B, 2ND FLOOR	Wilson	James	PhD	Network-Analytic Tools for Studying Functional and Structural Connectivity
91	BALLROOM B, 2ND FLOOR	Wilson	Tyia		The Role of Time and Space: A Multidimensional Approach to Exploring the Impact of Racism on Black Youth

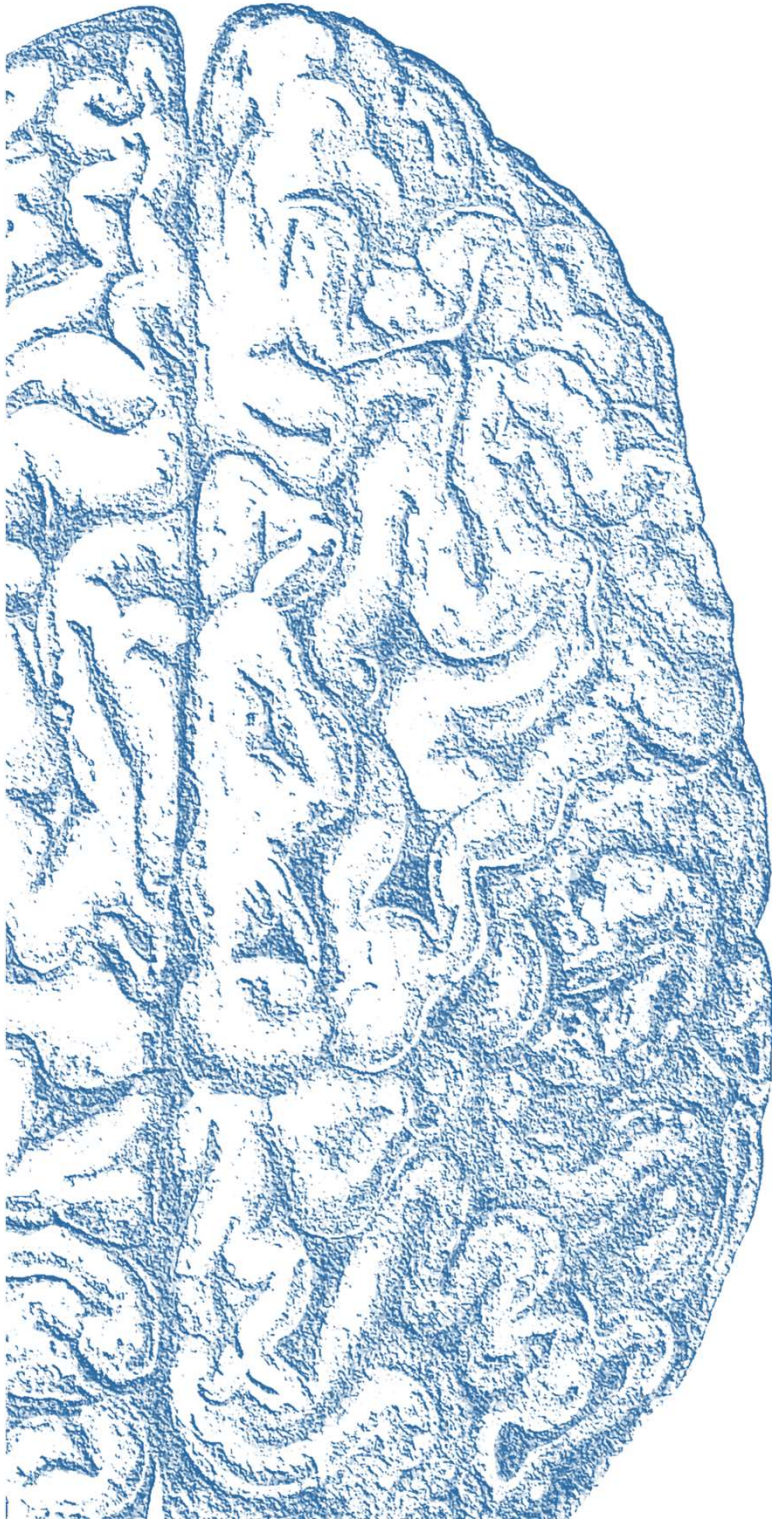


DEPARTMENT OF PSYCHIATRY

RESEARCH HALF DAY & RESEARCH RESOURCES REVUE

POSTERS

SORTED BY
POSTER ID #



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61	BALLROOM B, 2ND FLOOR	Rengasamy	Manivel	MD, PhD	Connections Between Inflammatory Markers, Neural Reward Circuitry, and Childhood Trauma in Depression
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63	BALLROOM B, 2ND FLOOR	Rohac	Rebecca	BS	Effects of Intravenous Ketamine on Explicit and Implicit Measures of Depression in Hospitalized Suicide Attempters
64	BALLROOM B, 2ND FLOOR	Runk	Ashlyn		Cognitive Correlates of Everyday Functioning in a Sample of Predominantly Low-Income, Community Dwelling, African-American Older Adults
65	BALLROOM B, 2ND FLOOR	Salisbury	Elisabeth	PhD	Physiologic indices of withdrawal in opioid-exposed newborn
66	BALLROOM B, 2ND FLOOR	Sammon	M. McLean		Associations among negative social media experiences, depressive symptoms, and SITBs in young adults
67	BALLROOM B, 2ND FLOOR	Satz	Skye	BS	Differential resting-state network connectivity is associated with memory consolidation processes in individuals with depressive disorders
68	BALLROOM B, 2ND FLOOR	Schoonover	Kirsten	PhD	Actin Regulation and Energy Production in Layer 3 Prefrontal Cortex in Schizophrenia

2021 Research Half Day/Resources Revue Abstracts - BY POSTER ID#

ID#	Location	Last Name	First Name	Degree	Presentation Title
69	BALLROOM B, 2ND FLOOR	Schumer	Maya	BS	Amygdala, Orbitofrontal, and Medial Prefrontal Activation During Implicit Facial Emotion Processing Distinguish Young Adults With Low and High Levels Of Negative Urgency From Those With Bipolar Disorder
70	BALLROOM B, 2ND FLOOR	Scott	Madeline	PhD	Altered 12 hour rhythms in the dorsolateral prefrontal cortex of subjects with schizophrenia
71	BALLROOM B, 2ND FLOOR	Sheehan	Haley		Acute Alcohol Consumption's Effects on Subsequent Same Day Sleep Characteristics: A Multi-Method Examination
72	BALLROOM B, 2ND FLOOR	Sheth	Shreya	MA	Negative Affect as a Predictor of Prospective Suicide Attempts in Borderline Personality Disorder
73	BALLROOM B, 2ND FLOOR	Sheynblyum	Miriam	BA	Feasibility Study to Train Speech-Language Pathologists to Work with Autistic Children
74	BALLROOM B, 2ND FLOOR	Skiba	Justin		Expressive Suppression and Anxiety in Children with Parental Cancer
75	BALLROOM B, 2ND FLOOR	Sklar	Alfredo	MD	Load-Dependent Functional Connectivity Deficits During Visual Working Memory in First-Episode Psychosis
76	BALLROOM B, 2ND FLOOR	Smith	Dana	BA	Effects of chemogenetic manipulation of VTA to amygdala projection on cocaine cue associative learning
77	BALLROOM B, 2ND FLOOR	Son	Sang Joon	MD	Accelerated brain aging using an established machine learning model: clinical application for the detection of cognitive function and amyloid status in the elderly
78	POSTER WITHDRAWN				
79	BALLROOM B, 2ND FLOOR	Byrd	Amy	PhD	The MoodY Study
80	BALLROOM B, 2ND FLOOR	Stepp	Stephanie	PhD	The STEADY Study
81	BALLROOM B, 2ND FLOOR	Stern	Harrison		Objective and Subjective Physical and Mental Health Benefits in Older Adults with Cardiometabolic Risk After a Diabetes Prevention Program-Based Lifestyle Intervention
82	BALLROOM B, 2ND FLOOR	Stiller	Ashley		Pittsburgh Girls Study Data Set
83	BALLROOM B, 2ND FLOOR	Stringfield	Sierra	PhD	Impact of THC on delay-phase neuronal activity during a working memory task
84	BALLROOM B, 2ND FLOOR	Thurston	Rebecca	PhD	Study of Women's Health Across the Nation (SWAN)
85	BALLROOM B, 2ND FLOOR	Tracy	Eunjin	PhD	Homeostatic sleep regulation and circadian rhythmicity are intact in older adults with insomnia
86	BALLROOM B, 2ND FLOOR	Tsypes	Aliona	PhD	Delay Discounting in Suicidal Behavior: Myopic Preference or Inconsistent Valuation?

2021 Research Half Day/Resources Revue Abstracts - BY POSTER ID#

ID#	Location	Last Name	First Name	Degree	Presentation Title
87	BALLROOM B, 2ND FLOOR	Vanwoerden	Salome	PhD	Autonomic nervous system response to conflict in youth interact with parents' supportive and non-supportive responses to predict borderline personality disorder symptoms
88	BALLROOM B, 2ND FLOOR	Wears	Anna	BA	Concordance of Model-Based Reinforcement Learning in Mothers and Daughters: The Impact of Maternal History of Major Depression
89	BALLROOM B, 2ND FLOOR	Westbrook	Cecilia	MD, PhD	Neural mechanisms of mindful disengagement from worry
90	BALLROOM B, 2ND FLOOR	Wilson	James	PhD	Network-Analytic Tools for Studying Functional and Structural Connectivity
91	BALLROOM B, 2ND FLOOR	Wilson	Tyia		The Role of Time and Space: A Multidimensional Approach to Exploring the Impact of Racism on Black Youth
92	POSTER WITHDRAWN				
93	BALLROOM B, 2ND FLOOR	Clifton	Sue	MEd	The University of Pittsburgh Clinical and Translational Science Institute
94	BALLROOM B, 2ND FLOOR	Stetten	George	MD, PhD	Visualization and Image Analysis (VIA) Lab
95	BALLROOM B, 2ND FLOOR	Cohen	Annie	PhD	Molecular Biomarkers in Psychiatry Program
96	BALLROOM B, 2ND FLOOR	Forster	Sarah	PhD	Mental Illness Research, Education and Clinical Center (MIRECC), Veterans Health Foundation (VHF) and the Behavioral Health Service, VA Pittsburgh Healthcare System

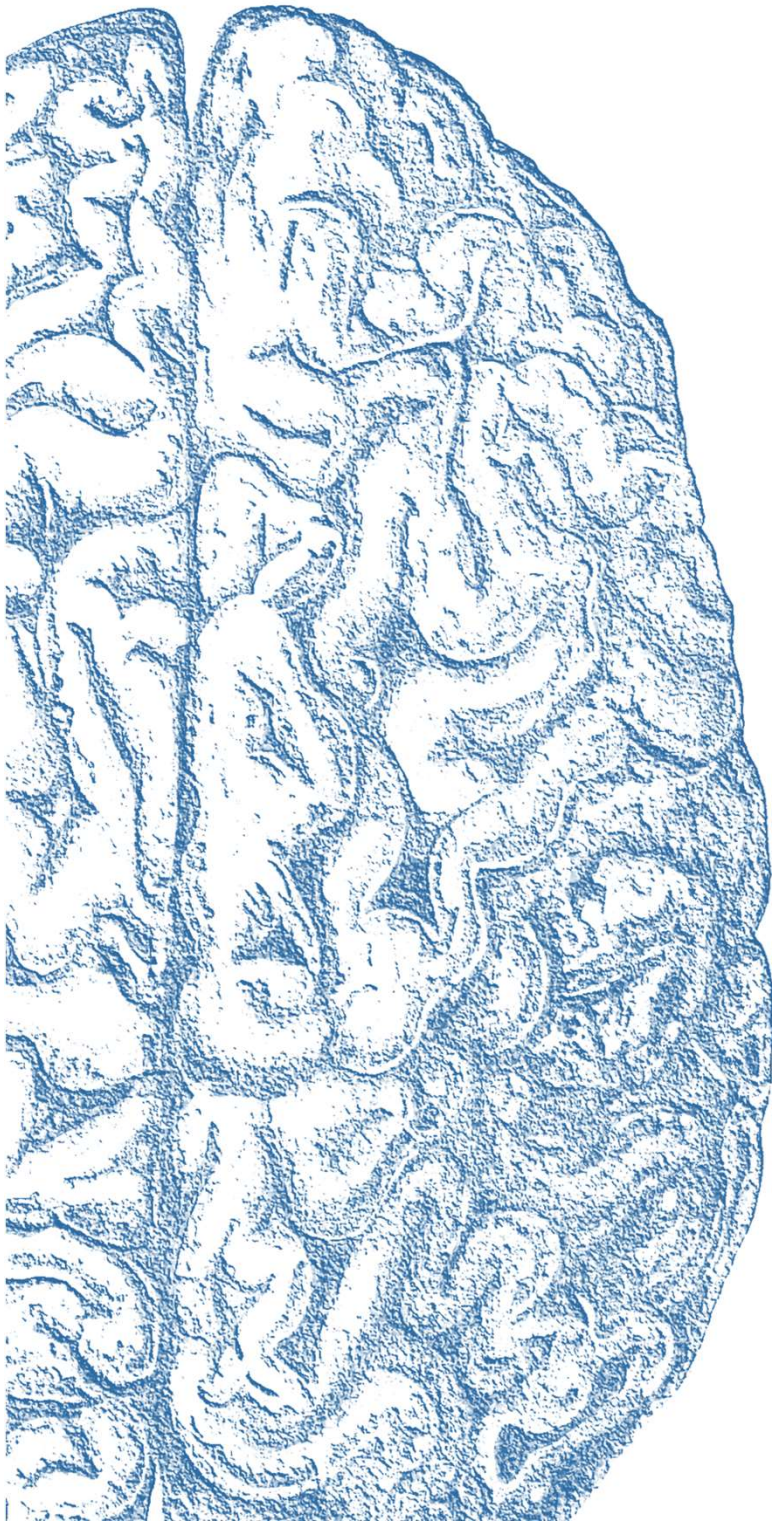


DEPARTMENT OF PSYCHIATRY

**RESEARCH HALF DAY
& RESEARCH RESOURCES REVUE**

**SCIENTIFIC
POSTERS**

SORTED BY ID #



2021 Research Half Day/Resources Revue Abstracts - SCIENTIFIC POSTERS

ID#	Location	Last Name	First Name	Degree	Presentation Title
1	BALLROOM A, 1ST FLOOR	Barko	Kelly	BS	Sex and brain region differences in microglia-specific gene expression
2	BALLROOM A, 1ST FLOOR	Battaglia	Lindsey	BA	Negative emotionality mediates the association between violence exposure in childhood and adolescent psychopathology
3	BALLROOM A, 1ST FLOOR	Baumann	Barbara	PhD	Comparison of online and in-person evidence-based treatment training: Access, impact, and satisfaction
4	BALLROOM A, 1ST FLOOR	Baumeister	Andrew		Cognitive flexibility of treatment responders vs non-responders in patients with depression after a single-dose ketamine infusion
5	BALLROOM A, 1ST FLOOR	Bell	Liz		Trauma Severity as a Predictor for Decreased Cognitive Flexibility in Depressed Patients: The Moderating Role of Self-Esteem
6	BALLROOM A, 1ST FLOOR	Bender	Brooke		Intermittent cocaine self-administration in rats has sex-specific effects on addiction-like behaviors: cue extinction, habitual and compulsive cocaine seeking, and motivation
7	BALLROOM A, 1ST FLOOR	Botkin	Tessa	BS	Helicopter Parenting of Adolescents with ADHD: Examination of Scale Factor Structure and Associations with Other Indices of Parenting
8	BALLROOM A, 1ST FLOOR	Brosseau	Pat		Alterations in the functioning of striatal subregions are associated with anhedonia as a function of striatal dopamine concentrations in adolescents with depression
9	BALLROOM A, 1ST FLOOR	Buckley	M. Nicole	BA	Connectedness, Racial Justice Distress, and Sleep Quality: Affective Well-being in the COVID-19 era
10	BALLROOM A, 1ST FLOOR	Burns	Jennifer		Diurnal variation in parvalbumin interneuron excitability in mouse prefrontal cortex
11	BALLROOM A, 1ST FLOOR	Call	Christine	PhD	Thinking critically about race data in perinatal research: An example with loss of control eating
12	BALLROOM A, 1ST FLOOR	Chang	Ya-Wen	MA	The Relationship of Childhood Trauma Experiences with the Age of Onset of First Suicidal Behavior in Late-Life Depression
13	BALLROOM A, 1ST FLOOR	Chase	Henry	PhD	In vivo evidence of enhanced low frequency BOLD oscillations during and following prefrontal cathodal tDCS stimulation
14	BALLROOM A, 1ST FLOOR	Cui	Ruifeng (Richard)	PhD	The Role of Social Connectedness and Cognitive Health in Predicting Suicide Risk in Depressed Older Adults
15	BALLROOM A, 1ST FLOOR	Curtis	Mark	BA	Cortex Attentional Gain Modulation is Impaired in First-Episode Psychosis
16	BALLROOM A, 1ST FLOOR	D'Aiuto	Leonardo	PhD	Development of Novel Therapies Against Viral Infections of the CNS
18	BALLROOM A, 1ST FLOOR	DePoy	Lauren	PhD	Prenatal circadian rhythm disruption induces sex-specific substance use-related phenotypes in mice
19	BALLROOM A, 1ST FLOOR	Dienel	Samuel		Lower Somatostatin mRNA Levels Without Deficits in Somatostatin Neuron Density in the Dorsolateral Prefrontal Cortex of Schizophrenia
20	BALLROOM A, 1ST FLOOR	Dowling	Kevin		Diagnostic and laminar differences in dorsolateral prefrontal cortex somatostatin transcripts in schizophrenia and mood disorders
21	BALLROOM A, 1ST FLOOR	Eckstrand	Kristen	MD, PhD	Medial prefrontal cortex activation to reward outcome moderates influence of sexual orientation victimization in adolescents and young adults
22	BALLROOM A, 1ST FLOOR	Elliot	Samuel		Developmental Changes in Intracortical Myelination are Associated with Ventral Striatum Dopamine
24	BALLROOM A, 1ST FLOOR	Enwright	John	PhD	Differential gene expression in layer 3 pyramidal neurons across three regions of the human cortical visual spatial working memory network

25	BALLROOM A, 1ST FLOOR	Fisher	Hayley	PhD	The effects of ethosuximide and n-acetyl cysteine on overgrooming in SAPAP3 knock-out mice.
26	BALLROOM A, 1ST FLOOR	Folmsbee	Sai	MD, PhD	Differences in dendritic spine density in post-mortem brains of individuals with obsessive compulsive disorder and healthy controls
27	BALLROOM A, 1ST FLOOR	Frigoletto	Olivia	BS	Child RSA Reactivity to Frustration and Maternal Invalidation as Risk Factors for Externalizing Problems Among At-Risk Preschoolers
28	BALLROOM A, 1ST FLOOR	Gannon	Jessica	MD	Treatment-Resistant Bipolar Depression; Insulin Resistance; Metformin; Randomized Clinical Trial; Placebo
29	BALLROOM A, 1ST FLOOR	Geramita	Matt	MD, PhD	Independent and distinct patterns of abnormal lateral orbitofrontal cortex activity during compulsive grooming and reversal learning normalize after fluoxetine
30	BALLROOM A, 1ST FLOOR	Gerlach	Andrew	PhD	Networks of Worry - the Complex Neural Underpinning of a Popular Phenotype
32	BALLROOM A, 1ST FLOOR	Glausier	Jill	PhD	Metabolomic Measures of Oxidative Stress in the Dorsolateral Prefrontal Cortex, Dorsal Striatum and Ventral Striatum in Schizophrenia
33	BALLROOM A, 1ST FLOOR	Griffo	Angela	BS	Transdiagnostic Determinates of Hippocampal Atrophy in Cognitive Function and Trauma
35	BALLROOM A, 1ST FLOOR	Jakubowski	Karen	PhD	Sexual Violence and Cardiovascular Disease Risk: A Systematic Review and Meta-Analysis
36	BALLROOM A, 1ST FLOOR	Jayaprakash	Hunsica		Hemispheric Amyloid Asymmetry and its relationship with cerebral metabolism and grey matter density: an investigation of early Alzheimer's Disease
37	BALLROOM A, 1ST FLOOR	Johnson	Arabella		Normed Versus Raw Hippocampal and Entorhinal Volumes as Predictors of Memory Performance
38	BALLROOM A, 1ST FLOOR	Kahru	Kevin		Associations of rest-activity rhythms with depression symptoms among retired day- and night-shift workers
39	BALLROOM A, 1ST FLOOR	Kazan	Joseph	MD	Temporal relations among emotional and behavioral factors in late-life depression during the COVID-19 Pandemic
40	BALLROOM A, 1ST FLOOR	Ketchesin	Kyle	PhD	Diurnal Alterations in Gene Expression Across the Human Dorsal and Ventral Striatum in Psychosis
41	BALLROOM A, 1ST FLOOR	Kim	Sam-Moon	PhD	Alterations in adolescence sleep and circadian rhythm as potential factors that increase risk of substance use disorders
42	BALLROOM A, 1ST FLOOR	Kolobaric	Antonija	ScB	Are all anxieties created equal? Stress-related networks and anxiety phenotypes in old age
43	GOLD ROOM	Leiker	Emily	PhD	Reduced amygdala activity to positive memories as a marker of depression risk
44	GOLD ROOM	Lewis	Madison		HCP-atlas Based Network Reveals Prefrontal-Temporal-Insular Hubs in First-Episode Psychosis and Heteromodal Association Hubs in Controls
45	GOLD ROOM	Longenecker	Julia	PhD	The Influence of Attention on Steady-state Auditory Evoked Potentials in First-Episode Psychosis
46	GOLD ROOM	López-Caballero	Fran	PhD	Neural generators of Pitch and Duration MMN deficits in first episode psychosis at baseline, 3, and 6 months
47	GOLD ROOM	McGuier	Elizabeth	PhD	Multidisciplinary team functioning and performance in Child Advocacy Centers: Associations with implementation outcomes
48	GOLD ROOM	McGuigan	Bridget		Cortical Thickness Influenced by Gene Expression in Schizophrenia Patients: A Study Utilizing the HCP Atlas.
49	GOLD ROOM	McKeon	Shane	BS	Development of EEG-derived spectral processing of working memory through adolescence
50	GOLD ROOM	Mitzner	Jackson		Burned out students report similar utilization rates, lower perceived efficacy of wellness resources
51	POSTER WITHDRAWN				
52	GOLD ROOM	Nelson	Lars	PhD	Striatal dysfunction in the Fmr1 knockout mouse

54	GOLD ROOM	Ojha	Amar		Puberty-related maturation of adolescent frontostriatal resting-state functional connectivity
55	BALLROOM B, 2ND FLOOR	Panny	Benjamin	ScB	Altered neural substrates of negative reinforcement in OCD patients
56	BALLROOM B, 2ND FLOOR	Parr	Ashley	PhD	Tissue iron, an indirect marker of basal ganglia dopamine, is associated with delinquency and related personality characteristics in late childhood: Initial findings from the ABCD-Social Development Study
58	BALLROOM B, 2ND FLOOR	Perica	Maria		Age-related changes in glutamate and GABA support excitatory/inhibitory balance during adolescence
59	BALLROOM B, 2ND FLOOR	Raskin	Brianna		Investigation of Age- and Sex-Normed Hippocampus and Entorhinal Volumes as Predictors of Subjectively Perceived Decline
60	BALLROOM B, 2ND FLOOR	Cannova	Elena		Neighborhood collective efficacy indirectly influences girls' anger regulation through parent factors
61	BALLROOM B, 2ND FLOOR	Rengasamy	Manivel	MD, PhD	Connections Between Inflammatory Markers, Neural Reward Circuitry, and Childhood Trauma in Depression
63	BALLROOM B, 2ND FLOOR	Rohac	Rebecca	BS	Effects of Intravenous Ketamine on Explicit and Implicit Measures of Depression in Hospitalized Suicide Attempters
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78	POSTER WITHDRAWN				
81	BALLROOM B, 2ND FLOOR	Stern	Harrison		Objective and Subjective Physical and Mental Health Benefits in Older Adults with Cardiometabolic Risk After a Diabetes Prevention Program-Based Lifestyle Intervention

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92	POSTER WITHDRAWN				

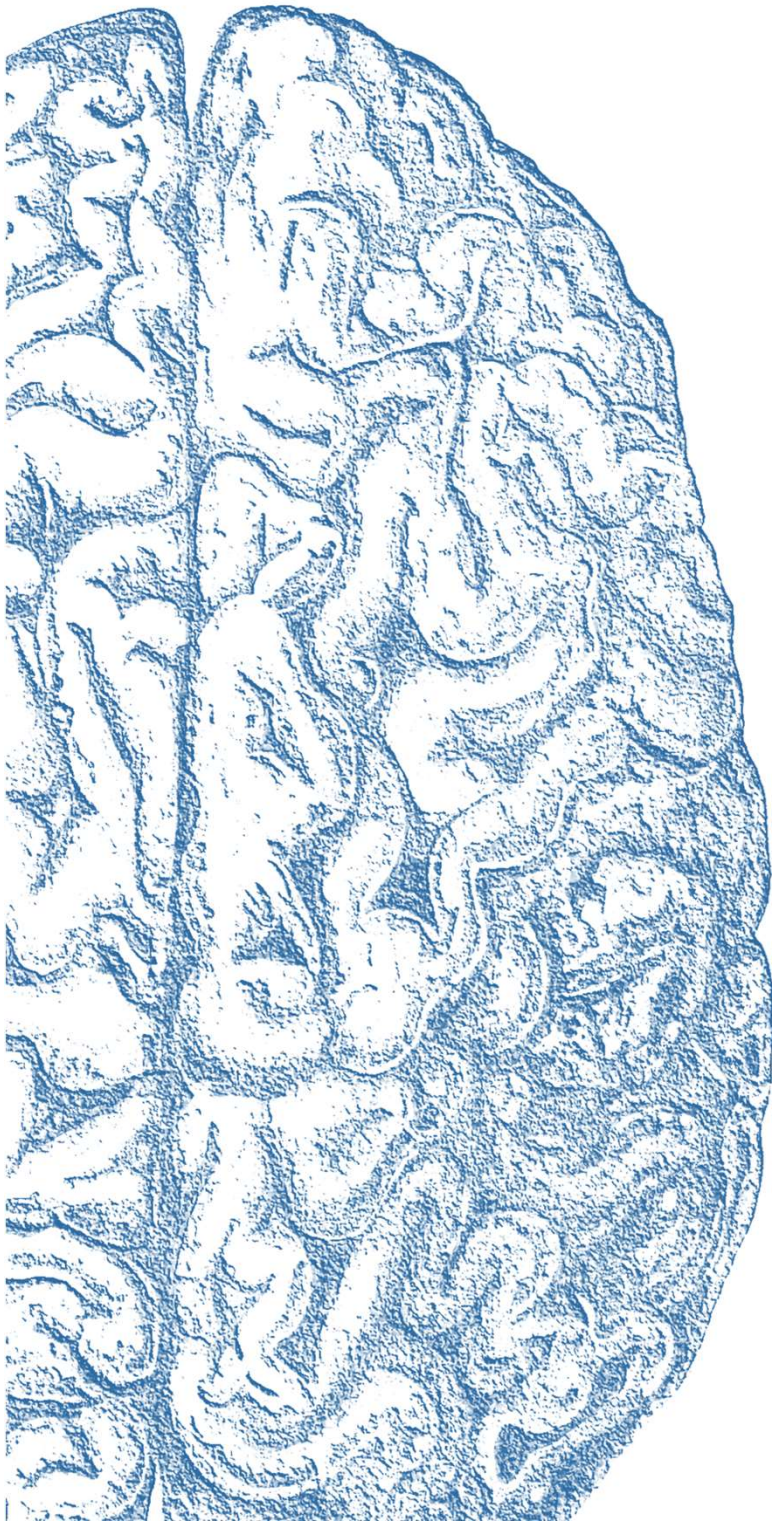


DEPARTMENT OF PSYCHIATRY

**RESEARCH HALF DAY
& RESEARCH RESOURCES REVUE**

**RESOURCE
POSTERS**

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2021 Research Half Day/Resources Revue Abstracts - RESOURCE POSTERS

ID#	Location	Last Name	First Name	Degree	Presentation Title
17	BALLROOM A, 1ST FLOOR	De Genna	Natacha	PhD	Maternal Health Practices and Child Development (MHPCD) Project
23	BALLROOM A, 1ST FLOOR	Ellis	Emily	BA	Dexcom G6 Clarity App; Tandem T-Slim Pump Data via Tandem Website
31	BALLROOM A, 1ST FLOOR	Glausier	Jill	PhD	Postmortem human brain tissue from more than 2,000 clinically well-characterized donors
34	BALLROOM A, 1ST FLOOR	Grubisha	Melanie	MD, PhD	A neurodevelopmental model to assess the impact of a myelin-associated signaling pathway on dendritic architecture across adolescence
53	GOLD ROOM	Nicassio	Christina	MS, MBA	Sleep and Behavioral Neuroscience Center
57	BALLROOM B, 2ND FLOOR	Pedersen	Sarah	PhD	Research Equity and Community Health (REACH) Collaborative
62	BALLROOM B, 2ND FLOOR	Riston	Sarah	MA	Assessing and Facilitating Interventions for Acute Risk for Suicide in a Remote Research Setting (NEURO-Stress Lab)
79	BALLROOM B, 2ND FLOOR	Byrd	Amy	PhD	The MoodY Study
80	BALLROOM B, 2ND FLOOR	Stepp	Stephanie	PhD	The STEADY Study
82	BALLROOM B, 2ND FLOOR	Stiller	Ashley		Pittsburgh Girls Study Data Set
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93	BALLROOM B, 2ND FLOOR	Clifton	Sue	MEd	The University of Pittsburgh Clinical and Translational Science Institute
94	BALLROOM B, 2ND FLOOR	Stetten	George	MD, PhD	Visualization and Image Analysis (VIA) Lab
95	BALLROOM B, 2ND FLOOR	Cohen	Annie	PhD	Molecular Biomarkers in Psychiatry Program
96	BALLROOM B, 2ND FLOOR	Forster	Sarah	PhD	Mental Illness Research, Education and Clinical Center (MIRECC), Veterans Health Foundation (VHF) and the Behavioral Health Service, VA Pittsburgh Healthcare System

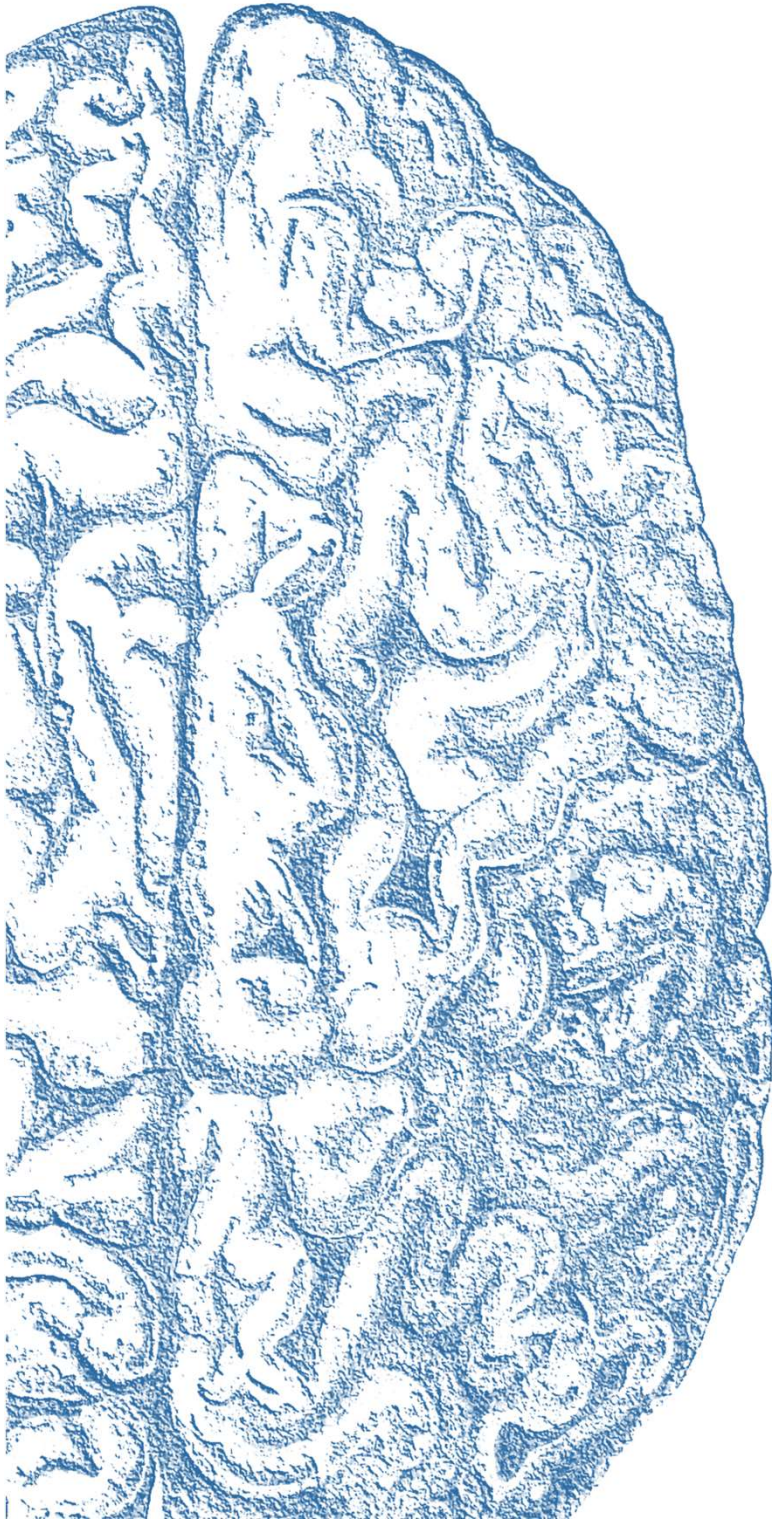


DEPARTMENT OF PSYCHIATRY

**RESEARCH HALF DAY
& RESEARCH RESOURCES REVUE**

ABSTRACTS

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**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Kelly Barko, BS

Current Position: Research Project Assistant

Presenter's Email Address: barkok@pitt.edu

Title: Sex and brain region differences in microglia-specific gene expression

Author(s): Barko K^{1,2}, Riskus S^{1,2}, Freyberg Z^{1,2}, Logan R³, Seney M^{1,2}

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Translational Neuroscience Program, University of Pittsburgh; ³Department of Pharmacology and Experimental Therapeutics, Boston University School of Medicine

Introduction: Microglia are resident macrophages of the brain, performing roles related to brain homeostasis, including modulation of synapses. Studies assessing morphological and transcriptional features of microglia found regional differences and sex differences in some brain regions. However, markers used to isolate microglia in these studies are not expressed exclusively by microglia. Here, we assessed the transcriptional profile of microglia after sorting with the microglia-specific marker TMEM119, focusing on brain region and sex differences.

Methods: Adult mice (n=6/sex) heterozygous for *Tmem119-2A-CreERT2* and *Ai14(RCL-tdT)-D* were administered 75mg tamoxifen/kg body weight via intraperitoneal injection once every 24 hours, for five days. Fluorescent activated cell sorting was used to isolate microglia of harvested tissue from prefrontal cortex (PFC), striatum, and midbrain. RNA-seq was performed and genes with $p < 0.05$ and fold change > 1.2 were considered differentially expressed (DE). Pathway overrepresentation was assessed using Metascape and IPA.

Results: We found striking differences in microglia-specific gene expression between brain regions. Genes more highly expressed in midbrain isolated microglia were enriched for pathways related to immune function. Genes more highly expressed in PFC isolated microglia were enriched for synapse-related pathways. Genes more highly expressed in microglia isolated from the striatum were enriched for pathways related to neurons, synapses, and the extracellular matrix. We also found sex differences in expression of microglia-specific genes in all 3 brain regions. Midbrain DE genes were enriched for pathways related to long-term synaptic depression and response to selenium ion. DE genes in the PFC were enriched for estrogen-mediated S-phase entry and altered T and B cell signaling. DE genes in the striatum were enriched for IL17 signaling and response to selenium ion pathways.

Conclusion: These results suggest both brain region and sex differences in the transcriptional profile of isolated microglia. Future studies will assess the effects of stress on microglia gene expression.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Lindsey P. Battaglia

Current Position: Research Associate

Presenter's Email Address: battaglia1p@upmc.edu

Title: Negative emotionality mediates the association between violence exposure in childhood and adolescent psychopathology.

Author(s): Battaglia L¹, Tung I¹, Keenan K², Hipwell AE¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine;

²Department of Psychiatry, University of Chicago School of Medicine

Introduction: The association between violence exposure and psychopathology has been well-established. Although the specific mechanisms of this association are under investigation, studies suggest early violence exposure may alter children's emotional reactivity and regulation, which increases risk for behavioral and emotional problems. Temperament refers to individual differences in emotional and behavioral responses to the environment, and emerging studies suggest it can be altered by early childhood experiences. The purpose of this study is to investigate the extent to which the association between childhood violence exposure and adolescent psychopathology is mediated by changes in negative emotionality.

Methods: Participants included 1,870 girls drawn from the longitudinal Pittsburgh Girls Study. Initially recruited when they were between 5-8 years old, the girls and their caregivers were assessed annually on violence exposure (violent crime victim and/or witness, domestic violence exposure) and symptoms of depression and anxiety, and conduct disorder (CD) and oppositional defiant disorder (ODD). Negative emotionality was assessed when girls were 5-8 (T1) and age 11 (T2). Using two multiple mediation models, we tested whether the association between violence exposure in childhood (age 8-10) and adolescent depression and anxiety, and CD and ODD outcomes (ages 15-17), respectively was mediated by changes in negative emotionality from T1-T2.

Results: Childhood violence exposure was associated with adolescent symptoms of depression and anxiety ($B=1.95, p=.001$) and ODD and CD ($B=4.04, p<.001$). This association was partially mediated by changes in negative emotionality from T1-T2 for both depression and anxiety ($B=-.09, SE=.06, 95\% CI=.01, .23$) and ODD and CD ($B=-.37, SE=.14, 95\% CI=.13, .65$).

Conclusion: Findings suggest that increases in negative emotionality partially explain the association between early violence exposure and later psychopathology symptoms. Further they suggest that early life stressors, such as violence exposures may contribute to changes in childhood temperament that may influence risk for psychopathology later in life.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Barbara L. Baumann, PhD

Current Position: Research Instructor in Psychiatry

Presenter's Email Address: baumannbl@upmc.edu

Title: Comparison of online and in-person evidence-based treatment training: Access, impact, and satisfaction

Author(s): Baumann BL¹ McGuier EM¹, Rounds J², Rumbarger K², and Kolko DJ¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²UPMC Western Psychiatric Hospital

Introduction: Online trainings in evidence-based treatments (EBTs) may reduce the time and cost of participation for practitioners, especially those in rural areas, independent practices, and small agencies. This presentation compares the effects of synchronous online vs. in-person trainings in an EBT.

Methods: We analyzed program data from trainings in Alternatives for Families: A Cognitive Behavioral Therapy (AF-CBT). AF-CBT is an EBT to treat/prevent aggression and child physical abuse. The training year combines 16 hours of workshops, 12 monthly case consultation calls, and fidelity monitoring. Prior to the pandemic, most workshops were in-person; during the pandemic, workshops moved online. All consultation calls were conducted online to include geographically dispersed participants. Practitioners (N = 286) completed questionnaires as part of routine program evaluation prior to and following the completion of basic training workshops and all consultation calls. Trainers recorded participant attendance and reviewed therapy recordings for fidelity.

Results: Baseline analyses include 160 in-person and 126 online participants. For in-person trainings, there were a similar percentage of licensed (54%) and unlicensed (46%) practitioners. Remote trainings included significantly more licensed practitioners (84%). Post-training data were available for 79 clinicians (55 in-person, 24 online). Both groups rated consultations as very good (4/5). Attendance was similar for both groups; 96-99% of participants attended the workshops and participants attended over 70% of consultation calls. Practitioners reported implementing the model more often after in-person training ($p = .037$); it's unclear if this is confounded by pandemic restrictions on services. There were no other significant differences between the groups. Fidelity ratings for both modalities were similar (range: 75.2% - 78.3%).

Conclusion: Participants in synchronous online and in-person training workshops were similar in fidelity, attendance, satisfaction, and material use. We will discuss potential advantages, barriers, and facilitators to each training modality (e.g., online for independent practitioners, in-person for large agencies).

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Andrew Baumeister

Current Position: Clinical Research Specialist

Presenter's Email Address: baumeistera@upmc.edu

Title: Cognitive flexibility of treatment responders vs non-responders in patients with depression after a single-dose ketamine infusion

Author(s): Baumeister A, Do-Nguyen K, Cruz N, Price R

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Research indicates sub-anesthetic ketamine results in rapid, substantial reductions of depressive symptoms. Ketamine has been shown to boost neuroplasticity and increase some aspects of cognition. However, the literature on ketamine's effects on cognitive flexibility (CF) is limited, and studies examining sex differences in outcomes have produced mixed findings.

Methods: 146 patients (63% female) with moderate-to-severe depression received a single infusion of ketamine (0.5mg/kg; 66% of sample) or saline in a randomized design. For the purposes of this blinded, interim analysis, patients who demonstrated $\geq 50\%$ reduction in clinician-rated depression scores from baseline to 24-hours were categorized as infusion responders ($n=63$) and were compared to non-responders ($n=83$). CF was measured at baseline, 24-hours and 5 days post-infusion. The NIH Toolbox Dimensional Change Card Sort Task and Flanker Task were used as performance-based measures of CF. The self-reported Cognitive Flexibility Scale (CFS) was used to measure subjective CF. A repeated measures ANOVA examined the main and interacting effects of time, treatment responders/non-responders, and sex on CF measures.

Results: On performance-based measures of CF, there were no interaction effects involving time. However, there was a significant sex*responder interaction effect for both measures (Card Sort: $F(1,123)=8.1, p=.005$; Flanker: $F(1,123)=4.1, p=.046$). Male infusion responders performed better than non-responders on both tasks, across all timepoints; whereas for females, responders did not reliably perform better than non-responders. For self-reported CF, there was a responder*time interaction ($F(2,276)=4.24, p=.015$). Responders reported improved CF following infusion relative to non-responders, with no moderating effects of sex.

Conclusion: For male patients, having better overall performance-based CF, both before and after the infusion, was a predictor of responding well to the infusion, suggesting a potential sex-specific moderator of depression outcomes. By contrast, treatment responders reported greater subjective improvements in CF, irrespective of sex, suggesting perceptions of cognitive function may improve rapidly along with depressive symptoms across both sexes.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Liz Bell, BS

Current Position: Research Specialist

Presenter's Email Address: bellec@upmc.edu

Title: Trauma Severity as a Predictor for Decreased Cognitive Flexibility in Depressed Patients: The Moderating Role of Self-Esteem

Author(s): Bell E, Woody M,, Price R

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Cognitive flexibility (CF) involves behavior adaptation in response to the environment. Studies have reported reduced CF in adults with trauma exposure. Additionally, childhood trauma (CT) has been associated with lower self-esteem and depressive symptomology. Self-esteem has also been linked to CF. Thus, we tested for a moderating relationship between CT and self-esteem in predicting CF impairments among depressed adults.

Methods: Subjects included 109 adults who met criteria for moderate to severe depression. Subjects were assessed at baseline and completed the Childhood Trauma Questionnaire (CTQ), Cognitive Triad Inventory (CTI)—self subscale to assess self-esteem, and two measures of CF—the self-report Cognitive Flexibility Scale (CFS), and a performance-based Affective Go/No-Go computer task which examines overall cognitive control and emotion inhibition.

Results: In a stepwise linear regression predicting CFS scores, there was a marginal relationship between CTQ scores and CFS scores in Step 1, ($\beta = -.159$ $p = .099$), a significant relationship for CTI self-esteem scores in Step 2, ($\beta = .316$ $p = .001$) and a significant interaction between CTQ * CTI self-esteem scores in Step 3 = ($\beta = -.912$, $p = .012$). No significant relationships were found in an identical stepwise regression predicting Go-No/Go scores. However, exploratory analyses showed a marginal interaction effect ($\beta = .666$, $p = .092$) for CTQ * CTI self-esteem during one specific Go-No/Go block contrasting happy (Go) and neutral (No-Go) faces.

Conclusion: Self-esteem inversely moderates the relationship between CT and lower CF for a self-report measure, but not for a behavioral task.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Brooke N. Bender

Current Position: PhD Candidate

Presenter's Email Address: brb173@pitt.edu

Title: Intermittent cocaine self-administration in rats has sex-specific effects on addiction-like behaviors: cue extinction, habitual and compulsive cocaine seeking, and motivation

Author(s): Bender B, Torregrossa M

Affiliation(s): Department of Psychiatry, Translational Neuroscience Program, Center for Neuroscience, University of Pittsburgh School of Medicine

Introduction: Intermittent access (IntA) models of cocaine self-administration, involving daily sessions of cocaine access separated by periods of cocaine unavailability, were developed to better model in rodents how cocaine is used by human drug users. Compared to traditional continuous access (ContA) models, IntA has been shown to facilitate compulsive, binge-like cocaine taking and increased motivation for cocaine. However, these experiments have been done primarily in male rats, and the effects of IntA on habit-like, DLS dopamine-dependent cocaine seeking have not been examined.

Methods: In the present study, male and female rats were implanted with jugular vein catheters and trained to self-administer cocaine paired with an audiovisual cue on a ContA or IntA schedule. To examine the role of Pavlovian audiovisual cues on drug seeking after ContA or IntA, rats underwent cue extinction (non-contingent exposure to 120 cues) or a control 0-cue procedure, followed by a cue-induced drug-seeking test. In subsets of rats, motivation for cocaine was tested using a progressive ratio procedure, compulsive cocaine taking was tested by pairing cocaine infusions with footshocks, or dependence of behavior on DLS dopamine (a measure of habit-like behavior) was tested by examining the effects of DLS infusion of the dopamine antagonist flupenthixol.

Results: Overall, cue extinction reduced cue-induced drug seeking after ContA or IntA, but IntA males appeared resistant to cue extinction. Compared to ContA, IntA resulted in increased motivation for cocaine, which was most pronounced in females. IntA facilitated more compulsive cocaine taking exclusively in males. After 10-11 days of IntA, but not ContA or 7-8 days of IntA, DLS infusion of dopamine antagonist reduced cue-induced drug seeking, particularly in males, suggesting the formation of DLS dopamine-dependent, habit-like behavior.

Conclusion: IntA impacts susceptibility to Pavlovian cue extinction, habit-like and compulsive cocaine seeking, and motivation for cocaine differently in males and females.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Tessa Botkin, BS

Current Position: Research Assistant

Presenter's Email Address: botkint@upmc.edu

Title: Helicopter Parenting of Adolescents with ADHD: Examination of Scale Factor Structure and Associations with Other Indices of Parenting

Author(s): Botkin, T. N.¹, Wiggs, K.², Kipp, H.¹, Lindstrom, R.¹, Joseph, H. M.³, Kolko, D. J.³, Molina, B. S. G.³

Affiliation(s): ¹University of Pittsburgh Medical Center Western Psychiatric Hospital;

²Department of Psychological and Brain Sciences, Indiana University;

³Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Research has established “helicopter parenting” (HP) as a distinct form of parental control over young adults, but less is known about HP in other samples. This study examined the factor structure of HP in adolescents with Attention-Deficit/Hyperactivity Disorder (ADHD).

Methods: Parents (n=341, 91% female) and adolescents (n=333; age 13-18; 25% female) completed a survey for a study on physician training in stimulant diversion prevention. A validated HP measure (Padilla-Walker & Nelson, 2012) was modified for adolescents. Other measures assessed parenting style and parent knowledge of adolescent activities. We conducted principal component analysis (PCA) for both informants' HP reports. We examined associations between component and informants' demographics and parenting measures.

Results: Our PCA yielded a two-factor solution: an intervention factor characterized by parents' problem-solving/decision-making for their adolescent and a parental monitoring/short-term planning (MSP) factor. For both reporters, parents exhibited less MSP HP for older adolescents, $r=-.21$, $r=-.15$, $p<.001$. Parents reported higher levels of intervention HP when they or their adolescent belonged to a marginalized race/ethnicity, $t(89.8)=2.73$, $p<.01$, or their adolescent was assigned male at birth, $t(157)=2.79$, $p<.01$. Parents reported more of both HP types if they were single, $t(99.6)=2.63$, $t(93.8)=2.01$, $p<.05$. For both reporters, more of both HP types, $r=.25$, $r=.13$, $p<.05$, $r=.19$, $r=.12$, $p<.01$, was associated with more knowledge of adolescent's activities. Higher intervention HP was associated with higher levels of positive parenting, $r=.20$, $r=.17$, $p<.01$. Adolescent-reported higher intervention HP was associated with higher parental warmth, $r=.18$, $p<.01$.

Conclusion: We observed consistency of factor structure across reporters and evidence of discriminant validity (differential relations of the two factors to other relevant variables). More research is needed to determine whether HP is adaptive for adolescents with ADHD.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Pat Brosseau, BS

Current Position: Graduate Student Researcher

Presenter's Email Address: pab177@pitt.edu

Title: Alterations in the functioning of striatal subregions are associated with anhedonia as a function of striatal dopamine concentrations in adolescents with depression

Author(s): Brosseau P^{1,3}, Henry T⁴, Ojha A^{1,3}, Diler R³, Ladouceur C^{1,2,3,5}

Affiliation(s): ¹Center for Neuroscience, University of Pittsburgh; ²Center for the Neural Basis of Cognition, University of Pittsburgh; ³Department of Psychiatry, University of Pittsburgh School of Medicine; ⁴Department of Psychology and School of Data Science, University of Virginia; ⁵Department of Psychology, University of Pittsburgh

Introduction: Anhedonia is a core symptom of depression that has been associated with poorer outcomes and alterations in the dopaminergic reward system, including the striatum. However, alterations to adolescent striatal function specifically with anhedonia relative to other depressive symptoms remain unclear.

Methods: Adolescents between 12-17 years old (n=75; 46 females) were recruited to participate in this study, with 56 participants displaying significant depressive symptoms. Participants completed a clinical interview, self-report measures of anhedonia and depressive symptoms, and an fMRI protocol that included two 6 min. resting state sessions. Regional homogeneity (ReHo) and mean standardized T2* were calculated within the striatum; the latter was used as a proxy for (inverse) tissue iron concentration, which in turn acts as a proxy for dopamine concentration. To examine the relationships between ReHo, mean T2* intensity, and anhedonia symptoms, we used a voxel-wise moderated mediation approach controlling for age, sex, and other depressive symptoms.

Results: Tissue iron concentration moderated the relationship between ReHo and anhedonia within the bilateral caudate and the left putamen. Simple slopes revealed that reduced ReHo was associated with increased anhedonia in adolescents with higher levels of tissue iron concentration in the right caudate (peak T=4.17), and with decreased anhedonia in adolescents with lower levels of tissue iron concentration in the same region (peak T=2.99). Lower tissue iron concentration in the left putamen was associated with higher levels of anhedonia overall (peak T=2.79).

Conclusion: Intrinsic connectivity in subregions of the striatum is associated with anhedonia, but the direction of this relationship is contingent upon levels of striatal dopamine concentrations. Such findings point to the need to examine whether dopamine-targeted pharmacotherapy may be particularly effective for a subset of adolescents with depression characterized by anhedonia, as well as the need for further research into adolescent anhedonia and striatal function.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: M. Nicole Buckley, BA

Current Position: Research Specialist

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Title: Family Connectedness, Racial Justice Distress, and Sleep Quality: Affective Well-being in the COVID-19 era

Author(s): Buckley M.N., Nance M, Brostowin A, Motyka E, Ladouceur C, Jones N, Alaron G, Ryan N, Eckstrand K, Silk J, Forbes E

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: The COVID-19 era has increased the vulnerability of adolescence by heightening threats to one's physical health, social relationships, and well-being (Gruber et al., 2020; Hawes et al., 2021). It has also included experiencing and/or witnessing striking health disparities and racial violence. COVID-19 related threats, combined with baseline risk factors for affective symptoms - such as reward neural systems - could increase risk for affective symptoms; however, whether social and societal factors of the COVID-19 era interact with baseline risk factors for current and/or future psychopathology in adolescence remains unclear.

Methods: Participants (N=44; 64% female; 48% racially diverse) were recruited from a longitudinal study investigating anhedonia development in adolescence. Participants were between ages 13-19 years and at low-versus-high risk for anhedonia based on family history of a mood or psychotic disorder. At study baseline, approximately 3 years earlier, participants completed an fMRI monetary reward task. During COVID-19, participants completed three weekly surveys in August 2020 assessing affective symptoms, family relationships, sleep, and distress regarding racial justice events.

Results: During COVID-19, participants reported moderate anhedonia, depression, and anxiety; fair sleep quality; and high distress about racial justice. 8% of participants endorsed past-week suicidality. Youth reporting greater family connectivity experienced lower depressive severity ($F[1,36]=6.04$, $p=.019$) and higher sleep quality ($F[1,42]=8.989$, $p=.005$). Greater baseline reward circuitry response in the visual cortex predicted higher sleep quality during this pandemic. Those with higher depressive severity in August 2020 reported greater distress about racial justice events, ($\beta=.393$, $p=.015$).

Conclusion: Adolescents experienced both psychological and racial justice distress during COVID-19, although experiences of distress were buffered by healthy function in reward circuitry. Together, these findings suggest family connectedness and reward circuitry function may serve as protective factors for affective well-being during the COVID-19 era. Future research will examine whether these factors serve as longer-term buffers in the ongoing COVID-19 pandemic.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Jennifer Burns

Current Position: Graduate Student Researcher

Presenter's Email Address: jnb55@pitt.edu

Title: Diurnal variation in parvalbumin interneuron excitability in mouse prefrontal cortex

Author(s): Burns J, Huang Y, McClung C

Affiliation(s): Translational Neuroscience Program, Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Approximately twenty-four-hour rhythms in behavior and physiology are widely conserved across the species and can be observed at the cellular and molecular level as changes in gene expression and cellular function. Previous studies in the prefrontal cortex (PFC) have shown that parvalbumin (PV) interneurons, which play a key role in regulating the excitation/inhibition balance and have been implicated in cognitive function, display diurnal changes in both PV expression and perineuronal nets (PNN). Given that studies have also found changes in PV cell excitability linked to PNN presence and overall diurnal changes in the excitation/inhibition balance have been observed in other cortical regions, we investigated diurnal changes in PV cell excitability, membrane properties, and the excitatory drive to these cells.

Methods: Male and female adult G42 mice were sacrificed at ZT 5-6 or 17-18 (lights on ZT 0) and slices were prepared for whole cell patch electrophysiology. PV cells in the medial PFC were selected for recording. Excitatory drive was measured as spontaneous excitatory postsynaptic currents to PV cells in the presence of picrotoxin. To measure PV cell excitability and membrane properties, current pulses were injected intracellularly (500ms; -60 to 300pA); responses were averaged across 3 repeats.

Results: We find that PV cells show reduced excitability in the dark phase, with fewer action potentials per current injection as well as diurnal variation in membrane properties.

Conclusion: These changes in PV cell excitability may have a profound impact on the overall excitation/inhibition balance of the PFC. Moreover, PV cells have been heavily implicated in psychiatric diseases and previous research in our lab has shown robust circadian reprogramming of the transcriptome in the PFC in schizophrenia. Therefore, through better understanding the normal diurnal changes in the physiology of these cells, we may gain insight into how these processes are disrupted in disease.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Christine C. Call, PhD

Current Position: Postdoctoral Scholar

Presenter's Email Address: callcc@upmc.edu

Title: Thinking critically about race data in perinatal research: An example with loss of control eating

Author(s): Call C¹, Boness C^{1,2}, Wang B³, Conlon R¹, Donofry S⁴, Levine M¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Center on Alcohol, Substance Use, and Addictions, University of New Mexico; ³Department of Statistics, University of Pittsburgh; ⁴Psychiatric and Behavioral Health Institute, Allegheny Health Network

Introduction: Loss of control eating (LOC), the perceived lack of control over the type or amount of food consumed, is common during pregnancy and associated with psychological distress and excess weight gain. Racially marginalized women have increased risk of perinatal LOC. However, given limited guidance on categorizing participants by race, particularly for multiracial participants, the stability of this association across different racial categorizations is unclear. This study explored whether the relation of LOC to race changed depending on how race was categorized.

Methods: Participants (N=257) with pre-pregnancy overweight/obesity were interviewed to assess LOC using the Eating Disorder Examination-Pregnancy Version at 7 assessments across pregnancy and 6-months postpartum. Frequency of endorsing LOC was summed across assessments. Participants self-reported race at baseline; the sample was 44% Black-only, 46% White-only, 9% multiracial, and <2% another race. In negative binomial regression models predicting LOC, we tested 3 methods of categorizing race.

Results: When examining White-only vs. Black-only vs. multiracial/other participants, Black-only participants reported LOC more frequently than White-only participants ($\beta=0.14$, $p=.08$), with 47% of Black-only vs. 30% of White-only participants endorsing LOC at ≥ 1 assessment. When multiracial Black participants were coded as "Black" instead of "multiracial," the difference between Black and White-only participants increased (LOC frequency ≥ 1 : 50% vs. 30% respectively; $\beta=0.16$, $p=.03$). When multiracial White participants were coded as "White" instead of "multiracial," the difference between Black-only and White participants decreased (LOC frequency ≥ 1 : 47% vs. 34% respectively; $\beta=0.10$, $p=.21$).

Conclusion: LOC occurred more frequently in Black vs. White perinatal women but the magnitude of the association between LOC and race varied by how race was categorized. These results emphasize that measurement, coding, analysis, and interpretation of race throughout the research process merit additional consideration. The structural factors that may underly the relationship between race and LOC (e.g., food insecurity, racism-related stress) also necessitate exploration.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Ya-Wen Chang, MA

Current Position: Database Coordinator

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Title: The Relationship of Childhood Trauma Experiences with the Age of Onset of First Suicidal Behavior in Late-Life Depression

Author(s): Chang Y-W¹, Galfalvy H^{2,3}, Buerke M¹, Szanto K¹

Affiliation(s): ¹University of Pittsburgh, Department of Psychiatry School of Medicine; ²Columbia University College of Physicians and Surgeons, Department of Psychiatry; ³New York State Psychiatric Institute, Department of Molecular Imaging and Neuropathology

Introduction: It is well established that stressful early life experiences can adversely impact long-term psychopathology, including depression and suicidal behaviors, in adolescence and adulthood. In addition, past studies have suggested that childhood trauma experiences are predictors of the onset of suicidal behaviors, however, none of these studies included older adults. The present study examined the relationship between childhood traumatic experiences and late-life suicide, and whether or not a difference exists between early-onset and late-onset attempters.

Methods: Participants included 234 adults aged 50 years and older (range: 50-81; M = 62.5, SD = 7.4) who reported on their experiences of childhood trauma such as emotional abuse, physical abuse, emotional neglect, physical neglect, and sexual abuse using the Childhood Trauma Questionnaire. The study examined group differences by comparing early-onset attempters and late-onset attempters to suicide ideators, non-suicidal depressed controls, and non-psychiatric healthy controls. Separate one-way ANOVA models were conducted to compare the groups on each measure.

Results: We found significant group differences in emotional abuse ($p < 0.001$), physical abuse ($p < 0.001$), emotional neglect ($p < 0.001$), and physical neglect ($p < 0.001$) in all subjects, and sexual abuse in females, ($p = 0.045$) but not in males ($p > 0.05$). As expected, healthy controls reported less abuse and neglect than the depressed groups. More importantly, early-onset attempters experienced more emotional abuse ($p = 0.004$) and neglect ($p = 0.005$) during childhood as compared to all other groups, while late-onset attempters were similar to the other depressed groups. Early-onset attempters also experienced more physical neglect than all other groups, except for suicide ideators.

Conclusion: Our results indicate that childhood trauma experiences are strongly associated with the onset of suicide attempts, with early-onset attempters experiencing more severe childhood trauma in multiple categories, including emotional neglect, emotional abuse, and physical neglect. In contrast, late-onset attempters had similar levels of these adverse experiences as compared to other depressed groups.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Henry W. Chase, PhD

Current Position: Research Assistant Professor

Presenter's Email Address: chaseh@upmc.edu

Title: *In vivo* evidence of enhanced low frequency BOLD oscillations during and following prefrontal cathodal tDCS stimulation

Author(s): Chase HW, Graur S, Bertocci MA, Stiffler R, Edmiston EK, Coffman BA, Phillips ML

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Transcranial direct current stimulation (tDCS) is a method of modulating neural activity and function via the application of a weak electrical current across the brain. However, the technique remains controversial, partly due to a lack of understanding of how such weak current might influence neural spiking. Here, we evaluated low frequency oscillations of BOLD signal in human participants using fMRI during and after cathodal tDCS stimulation, as a means of gaining insight into its effect on neural activity.

Methods: fMRI data were collected in 24 participants with bipolar disorder and 27 healthy control participants, while they received 1mA cathodal stimulation to the left ventrolateral prefrontal cortex or left somatosensory cortex (extracranial anode) and performed a reward paradigm. Resting fMRI data were collected after the stimulation. All fMRI data were analyzed using the amplitude of low frequency fluctuations (ALFF) method, and using whole brain repeated measures ANOVA.

Results: Significant main effects of stimulation (FWE-corrected cluster threshold of $p < 0.05$, $p < 0.001$ cluster forming threshold) were observed in the left inferior frontal gyrus (MNI xyz=-46,10,24; $k=1621$), supramarginal gyrus (xyz=-60,-24,34; $k=362$) and right premotor cortex (xyz=12,-2,52, $k=329$). Other interactions of stimulation with time or group did not reach corrected significance. Post-hoc analysis of the regions reaching corrected significance revealed that left ventrolateral prefrontal stimulation increased ALFF scores (i.e. power in BOLD timeseries between 0.01 and 0.1Hz) relative to left somatosensory stimulation.

Conclusion: We find clear evidence of a modulation of neural low frequency oscillations in BOLD signal, both during and after cathodal tDCS stimulation, generally proximal to the area of stimulation. The findings are consistent with a mechanism for tDCS's effect in terms of an impact on neural oscillations, and may provide a basis for an *in vivo* assay which can be used to optimize clinical interventions employing tDCS.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Ruifeng (Richard) Cui, PhD

Current Position: Advanced Fellow, MIRECC, VA Pittsburgh Healthcare System
Affiliated Faculty, Department of Psychiatry, University of Pittsburgh School of Medicine

Presenter's Email Address: ruifeng.cui@va.gov, cuir@upmc.edu

Title: The Role of Social Connectedness and Cognitive Health in Predicting Suicide Risk in Depressed Older Adults

Author(s): Cui R^{1,2}, Gujral S², Szanto K²

Affiliation(s): ¹MIRECC, VA Pittsburgh Healthcare System; ²Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Social connectedness is a protective factor against suicide risk among older adults. Conversely, cognitive impairment and especially executive dysfunction is a suicide risk factor in older adults. The present study investigated whether objective (i.e., number of close contacts and the frequency of these contacts) and subjective indicators of social connectedness (i.e., perceived social support) differentially relates to suicide risk in late life and whether social connectedness may moderate the negative impact of cognitive impairment on suicide risk.

Methods: Participants were 570 middle aged and older adults aged 50+ from a longitudinal case-controlled study of late-life suicide: 110 participants with no psychiatric history (control), 124 depressed participants with no history of suicidality (non-suicidal depressed), 119 depressed participants with current suicidal ideation (ideator), and 217 depressed participants with current ideation and a history of suicidal behaviors (attempter).

Social Network Index assessed objective social connectedness and Interpersonal Support Evaluation assessed subjective social connectedness. Global cognitive and executive functioning was assessed with the Mattis Dementia Rating Scale and Executive Interview.

Results: Both attempter and ideator groups had lower ratings of perceived social connectedness as compared to non-suicidal depressed or control groups. With respect to objective indicators of social connectedness, the attempter and ideator groups had the lowest rates of marriage and involvement in religious or volunteer groups. Additionally, attempters had worse global cognition and executive functioning relative to non-suicidal depressed and control participants and had fewer friends and fewer relatives they feel close to as compared to all other participant groups. There was a significant interaction between executive dysfunction and objective social connectedness, such that executive dysfunction was linked to higher objective social connectedness in healthy controls but lower connectedness in attempters.

Conclusion: Interventions targeting suicide risk may consider bolstering social connectedness, particularly in those with low cognitive health.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Mark T Curtis, BA

Current Position: Graduate Student

Presenter's Email Address: mac443@pitt.edu

Title: Auditory Cortex Attentional Gain Modulation is Impaired in First-Episode Psychosis

Author(s): Curtis M, Ren X, Fishel V, Torrence N, Wang Y, Seebold D, Farris R, Coffman B, Salisbury D

Affiliation(s): Clinical Neurophysiology Research Laboratory, Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Selective attention is impaired at the first episode of psychosis (FEP). EEG and MEG can measure selective attention during an auditory oddball task, as N1 amplitude increases with attention. We previously reported the EEG-measured N100-enhancement is reduced in FEP. Here, we localized MEG source activity within the auditory cortex, making novel use of the human connectome project multimodal parcellation (HCP-MMP) to identify precise cortical areas underlying this attention modulation in healthy individuals and impairments in FEP.

Methods: MEG was recorded from 27 FEP and 31 matched healthy controls (HC) while individuals either ignored tones while watching a silent movie or attended tones by pressing a button to oddball tones. The HCP-MMP defined 3 bilateral auditory regions of interest: A1, lateral belt, and parabelt. Averaged MEG source activity during the M100 (MEG analogue of the EEG N100) within regions was compared between conditions and groups. Coupling between theta/alpha phase and gamma amplitude was calculated within the ROIs.

Results: At the MEG source level, FEP had overall less source activity within the regions in both conditions ($p < 0.01$). In addition, there was a significant interaction between group and attention, where HC enhanced source activity with attention ($F(1,56) = 5.21$, $p < 0.05$), while FEP did not ($p > 0.05$). There was a significant increase in theta-gamma coupling in left A1 during the attend condition.

Conclusion: These results demonstrate deficits in both sensory processing and attentional modulation of the M100 in FEP. Novel use of the HCP-MMP revealed the precise cortical areas underlying attention modulation of auditory cortex activity in healthy individuals and demonstrated impairments in FEP. Further, increased theta coupling with sensory gamma power suggests the role for theta oscillations in the executive control of sensory gain modulation. Future work will investigate the underlying executive-control network involved in this attention modulation and potential deficits in FEP.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Leonardo D’Aiuto, PhD

Current Position: Research Assistant Professor

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Title: Development of Novel Therapies Against Viral Infections of the CNS

Author(s): D’Aiuto L¹, McNulty J.², Bloom D.³, Nimgaonkar, V¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Chemistry and Chemical Biology, McMaster University; ³Department of Molecular Genetics and Microbiology, University of Florida

Introduction: Neurotropic viral infections of the central nervous system (CNS) cause a broad spectrum of clinical manifestations, which include neuropathological changes and subsequent neurological conditions. Currently utilized antiviral drugs are targeted towards specific viruses. However, the recent pandemic caused by the neurotropic virus SARS-CoV-2 has highlighted the importance of having broad spectrum agents available in our armamentarium that can inhibit emerging COVID-19 variants and future unidentified pathogens that can pose a risk for the next global pandemic.

Methods: Using a human induced pluripotent stem cells (hiPSCs)-based platform, we have identified a small molecule termed “R430” which inhibits HSV-1 infections *in vitro* and *in vivo*. Importantly, later experiments showed that R430 exhibits potency against other DNA viruses (HSV-1, HCMV, HBV, HCV), as well as RNA viruses (ZIKV strains). However, higher toxicity when compared to acyclovir (the gold standard drug for herpes infections) was observed in fibroblasts and hepatocytes. Thus, we employed a structure-activity relationship study to generate new R430 analogs which would possess a comparable antiviral activity but reduced cellular toxicity. Brain organoids generated from two human hiPSC lines (01SD and 9001) were utilized to investigate the antiviral activity and cell toxicity of R430 derivatives.

Results: An R430 analog, R799, which exhibits antiviral activity comparable to R430 but with lower toxicity levels was identified. The drug concentration that reduced the percentage of infected cells by 50% (IC₅₀) was estimated to be 499.8 nM in 9001 and 221.3 nM in 01SD. No cell toxicity was detected up to 50 μM. We are currently testing R799 against a panel of DNA and RNA viruses, including SARS-CoV-2, and evaluating its antiviral activity *in vivo*.

Conclusion: R799 exhibits a remarkable inhibitory activity against HSV-1. If confirmed, the broad-spectrum activity of this novel compound will provide a novel therapeutic intervention against viral infection of CNS.

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenters: Natacha M. De Genna, PhD and Gale A. Richardson, PhD

Current Position: Assistant Professor

Presenter's Email Address: degennanm@upmc.edu

Resource(s): Maternal Health Practices and Child Development (MHPCD) Project

Description: The Maternal Health Practices and Child Development (MHPCD) Project is a longitudinal research program of prenatal and current substance use. Extensive data on maternal substance use, psychosocial, and environmental characteristics and offspring physical, behavioral, and cognitive development are available from several cohorts of women who were enrolled early in pregnancy from Magee Women's Hospital and interviewed at multiple time points with their offspring from birth through their offspring's young adulthood. Developmental psychologists Richardson and De Genna can also provide substance use expertise for ongoing and new projects including best practices for assessment, long-term effects of prenatal exposures and chronic substance use, and developmental trajectories of substance use.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Lauren DePoy, PhD

Current Position: Postdoctoral Associate

Presenter's Email Address: Imd113@pitt.edu

Title: Prenatal circadian rhythm disruption induces sex-specific substance use-related phenotypes in mice

Author(s): DePoy L, McClung C

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: 20% of Americans are at risk for circadian rhythm disruptions (CRD) due to shift work. These individuals experience substantial negative health outcomes, but females are especially affected with greater vulnerability for substance use (SU) and adverse outcomes associated with pregnancy. Offspring are also affected at birth and later in life. Prenatal CRD (pCRD) in mice recapitulates these risks, increasing adverse pregnancy outcomes and anxiety in adult offspring. However, it is unknown whether pCRD affects SU.

Methods: C57Bl/6J dams were sham handled or disrupted, by reversing the light/dark cycle 4 times during gestation. Behavior was measured in mature offspring. Cocaine reward was measured using conditioned place preference. Contingency degradation was used to measure decision making. Another cohort responded for food before jugular catheterization. After recovery, mice were trained to respond on another lever for cocaine. Acquisition, the reinforcing and motivational properties of cocaine, extinction and cue-induced reinstatement were measured. Open field and elevated plus maze were also performed.

Results: Females exposed to pCRD developed an anhedonic-like phenotype with decreased food self-administration, cocaine intake and reinforcement. On the other hand, males showed a SU-like phenotype with increased cocaine preference, higher order food self-administration and cocaine reinforcement. Furthermore, male pCRD mice maintained goal-directed decision making, responding more on a reinforced compared to degraded lever, while female pCRD mice did not, indicating habits. To determine whether these divergent behavioral profiles are unique to reward I measured anxiety-like behavior, which paralleled reward. Anhedonic-like female pCRD mice showed an increase in anxiety-like behavior while males showed a decrease.

Conclusion: These results suggest that pCRD may predispose individuals to distinct psychiatric disorders based on sex, mood disorders in females and SU disorders in males. By understanding how disrupted rhythms during pregnancy affect behavior in adulthood, we can develop novel therapeutic approaches for SU and mood disorders.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Samuel J. Diemel

Current Position: Graduate Fellow

Presenter's Email Address: sjd47@pitt.edu

Title: Lower Somatostatin mRNA Levels Without Deficits in Somatostatin Neuron Density in the Dorsolateral Prefrontal Cortex of Schizophrenia

Author(s): Diemel S^{1,2}, Fish K², Lewis D²

Affiliation(s): ¹Medical Scientist Training Program, University of Pittsburgh School of Medicine;

²Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Cognitive dysfunction in schizophrenia is associated with altered GABA signaling markers in the prefrontal cortex (PFC). For example, levels of somatostatin (SST) mRNA, expressed in a subset of GABA neurons, are markedly lower in PFC gray matter in schizophrenia. The density of SST mRNA+ neurons is also lower in schizophrenia. However, whether schizophrenia is associated with fewer SST neurons or a failure of certain SST neurons to express detectable levels of SST mRNA remains unknown.

Methods: To identify all SST neurons, we used multiplex fluorescent *in situ* hybridization to simultaneously label neurons containing SOX6 (expressed in both SST and parvalbumin (PV) neurons) and vesicular GABA transporter (VGAT) mRNAs, neither of which appear altered in schizophrenia, and SST or PV mRNA. SOX6+/VGAT+/SST+ and Sox6+/VGAT+/PV- neurons were considered SST neurons. The density of labeled neurons was quantified in 30 matched pairs of schizophrenia and unaffected comparison subjects.

Results: In DLPFC gray matter, mean density of SOX6+/VGAT+/SST+ neurons was significantly 31.3% lower in schizophrenia subjects ($F_{1,51} = 7.6, p = 0.008$), but the density of SOX6+/VGAT+/PV- neurons (which includes all SST neurons regardless of SST mRNA level) did not significantly differ between subject groups ($F_{1,51} = 1.4, p = 0.25$; Bayes' Factor in favor of null hypothesis = 3.01). Studies in the same cohort using high resolution imaging to quantify levels of SST per neuron are in progress.

Conclusion: These findings indicate that the density of SST neurons is not altered in schizophrenia, but a subset of these neurons fail to express detectable levels of SST mRNA. The presence of a normal complement of SST neurons suggests that these neurons can be targeted by therapeutic interventions to improve cognitive dysfunction in schizophrenia.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Kevin F. Dowling

Current Position: MD PhD Student

Presenter's Email Address: kfd10@pitt.edu

Title: Diagnostic and laminar differences in dorsolateral prefrontal cortex somatostatin transcripts in schizophrenia and mood disorders

Author(s): Dowling KF^{1,2}, Dienel SJ^{1,2}, Barile Z¹, Bazmi HH¹, Lewis DA^{1,3}

Affiliation(s): ¹Translational Neuroscience Program, Department of Psychiatry, University of Pittsburgh, School of Medicine; ²Medical Scientist Training Program, University of Pittsburgh;

³Department of Neuroscience, Dietrich School of Arts and Sciences, University of Pittsburgh

Introduction: Schizophrenia (SCZ), bipolar disorder (BP), and major depression (MD) demonstrate evidence of altered inhibitory circuitry in the dorsolateral prefrontal cortex (dlPFC). Somatostatin mRNA (SST), which codes for a neuropeptide expressed in select types of inhibitory interneurons, is lower in the dlPFC in each disorder. However, it is unclear whether this shared deficit reflects alterations in overlapping or distinct SST+ sub-populations, which are enriched in different cortical layers.

Methods: Donor dlPFC specimens (n=180) from SCZ, BP, MD, and unaffected controls (UC) were matched into tetrads by sex and age. Postmortem interval, pH, RNA integrity number, and storage time did not differ across diagnoses. RNA was collected from superficial and deep cortical layers by laser microdissection. SST transcript expression ratios were quantified with qPCR.

Results: A significant effect of diagnosis on SST expression emerged in superficial cortical layers ($F_{3,164}=3.4$, $p_{FDR}=0.01$) but not deep layers. Post-hoc testing revealed SST expression was lower in superficial layers (-34.1%, Dunnett's $p=0.042$) in SCZ, while exploratory analyses suggest SST was only marginally lower in deep layers (-31.1%, Dunnett's $p=0.07$), despite a moderate effect (Cohen's $d=-0.51$). However, for MD, SST expression was lower only in superficial layers (-25.6%, Dunnett's $p=0.016$), with smaller deficits in BP (-16.0% superficial, -15.5% deep, ns). When grouped by symptom domain (psychosis [SCZ], mood [MD, BP-psychosis], and mixed psychosis+mood [schizoaffective, MD+psychosis, and BP+psychosis]), SST expression did not differ between groups in superficial or deep layers. However, qualitative comparisons of effect size demonstrate larger reductions in SST in psychosis and mixed groups (Cohen's d range=-0.72 to -0.46) than for mood disturbances only (Cohen's d range=-0.22 to -0.32), regardless of layer.

Conclusion: Patterns of lower SST mRNA in the dlPFC differ among SCZ, BP, and MD diagnoses. Moreover, lower deep layer SST mRNA may represent a deficit associated with psychotic features, independent of diagnostic category.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Kristen L. Eckstrand, MD, PhD

Current Position: Postdoctoral Scholar

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Title: Medial prefrontal cortex activation to reward outcome moderates influence of sexual orientation victimization in adolescents and young adults

Author(s): Eckstrand K^{1,2}, Buckley N¹, Nance M³, Lindemuth M⁴, Alarcon G⁵, Ryan N¹, Jones N¹, Marshal M¹, Silk J⁶, Forbes E^{1,2}

Affiliation(s): ¹ Department of Psychiatry, University of Pittsburgh School of Medicine; ² UPMC LGBTQ+ Health; ³ Department of Psychology, University of Missouri St. Louis; ⁴ Department of Psychology, Virginia Tech; ⁵ Neuroscience Education Institute, San Diego; ⁶ Department of Psychology, University of Pittsburgh

Introduction: Sexual minority youth and young adults (SMY) are at greater risk for depression than their heterosexual counterparts¹. Minority stress theory posits that sexual orientation victimization acts as a chronic stressor to influence depression². Stress may increase depression severity by altering activity in neural reward systems³. This study examines (a) whether orientation victimization impacts neural reward activity and, subsequently, depression and (b) whether these relationships differ by SMY status.

Methods: 81 participants ages 15-22 years (41% SMY, 52% racially diverse) were included. Participants reported identity victimization, depression, and anhedonia and underwent a standardized monetary reward fMRI task. Neural reward activity was determined by significant neural response ($p_{FWE} < 0.05$) to reward>neutral outcome. Multivariate linear models examined differences in depression, anhedonia, and neural reward activity by identity and victimization. Interacting moderation models examined the impact of neural reward activity and identity on relationships between victimization and depression.

Results: Ventral striatum, medial prefrontal cortex (mPFC), anterior cingulate cortex, and orbitofrontal cortex were significantly activated during reward. SMY experienced higher depression and anhedonia ($p \leq 0.01$). SMY experienced more orientation victimization ($p < 0.001$); racially diverse individuals experienced more race victimization ($p = 0.03$). Higher depression was associated with more victimization by orientation and race ($p < 0.05$). Orientation victimization predicted higher mPFC reward activity ($p = 0.04$). mPFC reward activity moderated the relationship between orientation victimization and depression ($p = 0.04$), with higher mPFC activity and more orientation victimization predicting higher depression. SMY status did not moderate this interaction.

Conclusion: Higher orientation victimization, most experienced in SMY, and higher mPFC activation interacted to predict depression severity. The lack of interaction with SMY status lends support for the broad role of mPFC in stress and depression. These novel results provide evidence for victimization as an environmental stressor moderating mPFC function. These findings provide a first step towards understanding the neural impact of minority stress and its impact on depression in SMY.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Samuel Elliott

Current Position: Graduate Student

Presenter's Email Address: sae71@pitt.edu

Title: Developmental Changes in Intracortical Myelination are Associated with Ventral Striatum Dopamine

Author(s): Elliott S^{1,2}, Parr A², Larsen B⁴, Dowling K², Foran W³, Callabro F^{1,3}, Luna B^{1,2,3}

Affiliation(s): ¹, Department of Psychology, University of Pittsburgh; ²Department of Psychiatry, University of Pittsburgh School of Medicine; ³Department of Bioengineering University of Pittsburgh; ⁴Department of Psychology, University of Pennsylvania

Introduction: Cortical thinning is well established to persist through adolescence, especially in the prefrontal cortex as cognition improves. Recent studies indicate that gray matter thinning may be primarily underlied by increased myelination. In addition, there is emerging evidence that dopamine (DA) may play an important role in myelination. However, how maturation of DAergic systems contribute to myelination and cortical thinning is not understood.

Methods: Thus, we characterized how striatal neurophysiology and indices of DA mediate the age-related increases in intracortical myelination and cortical thinning. Ninety 12-31 year-olds (45 females) including 170 total sessions across two longitudinal visits 18mo apart were included. 3T MRI scanning included magnetization transfer (MT), to assess myelin content within gray matter, MPRAGE to assess cortical thinning, and R2', to quantify non-heme tissue iron, which has been associated with presynaptic dopamine availability.

Results: Whole brain intracortical myelination increased significantly with age ($p < .001$), which were widespread across the cortical surface. ROI analysis identified particularly robust changes in dorsolateral prefrontal and parietal cortices. We also found that increases in intracortical myelination were associated with decreases in R2' measures in par with developmental changes in these measures after controlling for cortical thickness ($p < .05$), particularly in parietal regions. We will also report on mediation by R2' on the association between myelination and cortical thinning.

Conclusion: These results suggest that maturational changes in striatal dopamine may play a role in myelination and cortical thinning through adolescence illustrating an important mechanisms of plasticity through adolescence that can inform normative but also impaired developmental trajectories such as in psychopathology, which predominantly emerges in adolescence.

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenter: Emily Ellis, BS

Current Position: Research Associate of Psychiatry at UPMC

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Resource(s): Dr. Andrew Seidman, PhD Post. Doc. University of Pittsburgh; Dexcom G6 Clarity App; Tandem T-Slim Pump Data via Tandem Website

Description: The Dexcom G6 Clarity application is a recent technological advancement for diabetics of all types. This app is free to anyone who has the correct operating system. It functions as an artificial pancreas when used with a compatible medical device, such as the Tandem T-Slim Insulin Pump. This compatibility allows for more control for diabetics over their health, providing them with constant feedback regarding their health. The Clarity app itself generates several reports based on day length (i.e., the past 2, 7, 14, or 30 days) and provides vast amounts of data to help diabetics gain better management. Some of the data includes a measured index of A1C, or overall glucose levels, and glucose level patterns over-time. This app also makes it easy to share data with health care providers, allowing for better collaboration between doctor and patient via the cloud. The patient has the advantage of sharing their data via email with anyone to customize their best care. Dexcom is not the only company using this continuous glucose monitoring system. The goal is for all diabetics to be using this closed loop, artificial pancreas option. This allows for optimal access to their own data, on their own time, to create the best care for the individual. Access to this type of continuous EMA method for collecting data is the next step in better understanding how to manage diabetes.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: John Enwright, PhD

Current Position: Instructor

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Title: Differential gene expression in layer 3 pyramidal neurons across three regions of the human cortical visual spatial working memory network

Author(s): Enwright, III J¹, Arion D¹, MacDonald W^{2,3}, Elbakri R^{2,3}, Pan Y⁴, Vyas G⁴, Berndt A⁴, Lewis D^{1,5}

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Pediatrics, University of Pittsburgh School of Medicine; ³Health Sciences Sequencing Core, Rangos Research Center, UPMC Children's Hospital of Pittsburgh; ⁴UPMC Genome Center; ⁵ Department of Neuroscience, University of Pittsburgh

Introduction: Visual spatial working memory (vsWM) is mediated by a distributed cortical network composed of multiple nodes, including primary visual (V1), posterior parietal (PPC) and dorsolateral prefrontal (DLPFC) cortices. Feedforward and feedback information is transferred among these nodes via projections furnished by pyramidal neurons (PNs) located primarily in cortical layer 3. Morphological and physiological differences among layer 3 PNs across these nodes have been reported; however, the transcriptional signatures underlying these differences have not been examined in the human brain.

Methods: RNA sequencing was used to interrogate the transcriptomes of layer 3 PNs from 39 neurotypical human subjects across V1, PPC and DLPFC; three critical nodes of the vsWM network.

Results: Over 8,000 differentially-expressed genes (DEGs) were detected, with more than 6,000 transcriptional differences present between layer 3 PNs in V1 and those in PPC and DLPFC. Additionally, over 600 other genes differed in expression along the rostral-to-caudal hierarchy formed by these three nodes. Moreover, pathway analysis revealed enrichment of genes in V1 related to circadian rhythms and in DLPFC of genes involved in synaptic plasticity.

Conclusion: These results show robust regional differences in the transcriptome of layer 3 PNs which likely contribute to regional specialization in their morphological and physiological features and thus in their functional contributions to vsWM.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Hayley Fisher

Current Position: Postdoctoral Fellow

Presenter's Email Address: hkf5@pitt.edu

Title: The effects of ethosuximide and n-acetyl cysteine on overgrooming in SAPAP3 knock-out mice.

Author(s): Fisher H, Rueda P, Thomas L, Ahmari S

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Obsessive-Compulsive Disorder (OCD) is characterized by maladaptive obsessions and compulsions. Two neurobiological components of OCD are thalamic dysfunction and abnormal glutamatergic activity. Therefore, ethosuximide (ETX), a T-type calcium channel blocker (important for thalamic function), and n-acetyl cysteine (NAC), a drug that normalizes extracellular glutamate, may be effective in reducing OCD-relevant behaviors. Here, we acutely administered doses of ETX and NAC to determine whether they reduced grooming in SAPAP3 KO mice, a genetic model of compulsive behaviors. We hypothesized that ETX and NAC would dose-dependently reduce grooming in SAPAP3 KO mice.

Methods: Mixed sex groups of SAPAP3 KO (n=9) and SAPAP3 WT (n=11) were used. Mice received once-daily injections of either ETX (10, 30, 100, 200 mg/kg), NAC (25, 50, 100 mg/kg), MTEP (20 mg/kg), or Vehicle (Saline). MTEP, an mGluR5 antagonist, was used as a positive control. Across the experiment, mice received all doses of all drugs in a randomized order. Each drug administration day, mouse behavior was recorded during the 30 min pre- and post-injection periods.

Results: Hand-scored video analysis indicated that 200 mg/kg ETX decreased total percent grooming ($p < 0.05$) in SAPAP3 KO mice, and marginally decreased average bout duration ($p = 0.054$) between the pre-injection and post-injection period. The number of grooming bouts was not different between the pre- and post-injection period ($p = 0.39$). In ongoing analyses, we are quantifying the effects of NAC, and using a combination of DeepLabCut and B-SOID (developed by our collaborator, Dr. Eric Yttri) to assess OCD-relevant behaviors pre- and post-drug administration.

Conclusion: Although total percent grooming and bout duration decreased after ETX exposure, the number of grooming bouts was not. This suggests ETX may increase the ability to disengage from compulsive behavior rather than reduce behavior initiation. Future studies will investigate the effects of ETX on OCD-relevant behaviors like reversal learning, and whether chronic administration produces similar effects as acute administration.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Sai Folmsbee, MD, PhD

Current Position: Postdoctoral Fellow

Presenter's Email Address: folmsbeess@upmc.edu

Title: Differences in dendritic spine density in post-mortem brains of individuals with obsessive compulsive disorder and healthy controls

Author(s): Folmsbee SS, Newman J, Sweet R, Fish K, Lewis D, Ahmari SE

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: The cellular and molecular pathogenesis of obsessive compulsive disorder (OCD) is largely unknown, but brain imaging studies have suggested that hyperactivity in decision-making regions of the brain, specifically the orbitofrontal cortex (OFC), is associated with OCD symptoms. Recent work has shown significant differences in the expression of excitatory genes in human patients with OCD compared to unaffected comparison subjects using post-mortem samples from the University of Pittsburgh Brain Tissue Donation Program. Based on these previous studies, we predicted these transcriptional alterations may have an impact on dendritic spine architecture. Therefore, we have measured dendritic spine density in OFC of individuals with OCD and matched unaffected comparison subjects (n=11).

Methods: Dendritic spines were measured by staining with a combination of spinophillin and phalloidin in tissue sections of OFC using confocal microscopy. Furthermore, previous studies have shown that the OFC receives aberrant input from the thalamus in OCD, and that the thalamic input is specific to layers III/IV. Because of this, the gray matter was divided into layers I-VI, and dendritic spine density was measured within each layer. Additionally, given the importance of spine morphology in its function, we calculated the differences in spine density among varying spine sizes between OCD individuals and healthy controls.

Results: Together, using confocal imaging and immunohistochemistry, we were able to measure layer and size-specific dendritic spine density changes in post-mortem samples of individuals with OCD. We found a significant decrease in overall dendritic spine density in individuals with OCD. Interestingly, there did not appear to be any specificity for this effect in different cortical layers, or among different spine sizes.

Conclusion: From these experiments, we were able to determine the nature of changes to dendritic spine density in post-mortem human brain tissue among individuals with OCD.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Olivia A. Frigoletto, BS

Current Position: Research Assistant

Presenter's Email Address: frigolettooa@upmc.edu

Title: Child RSA Reactivity to Frustration and Maternal Invalidation as Risk Factors for Externalizing Problems Among At-Risk Preschoolers

Author(s): Frigoletto O, Byrd A, Vine V, Vanwoerden S, Stepp S

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Early childhood is a critical period for emotional development. Children of parents who struggle with emotion regulation may be at greatest risk for developing internalizing and externalizing problems. The current study examines potential mediators (child physiological reactivity and parental invalidation) of the link between maternal emotion dysregulation and internalizing and externalizing problems in two groups of preschoolers (36-48 months): an at-risk group with mothers who have borderline personality disorder and a low-risk group of non-disordered mothers (healthy controls; HC).

Methods: Preliminary analyses included 77 mothers (35% minority status) and their children (47% minority status), including 39 mothers with BPD and 38 HC mothers. Child physiological reactivity was examined using continuous recordings of respiratory sinus arrhythmia (RSA) during a baseline task and a frustration task. The parent-reported Coping with Children's Negative Emotions Scale was used to assess maternal invalidation. Teachers reported on internalizing and externalizing problems observed in the preschool setting using the Teacher Report Form.

Results: Associations between maternal group status, RSA reactivity, maternal invalidation and internalizing and externalizing symptoms were examined in MPlus. Children of mothers with BPD experienced greater RSA reactivity during the frustration task ($\beta = -.181, p = .042$) and more maternal invalidation ($\beta = .501, p < .001$), relative to children in the HC group. Additionally, the interaction between child physiological reactivity and maternal invalidation predicted higher externalizing problems, specifically aggression ($\beta = -.367, p = .039$). All findings remained significant after controlling for the effects of child age, child sex, receipt of public assistance, and estimated IQ.

Conclusion: Findings support research suggesting that children of parents with poor emotion regulation are at greater risk for developing internalizing and externalizing problems. These at-risk children displayed greater physiological reactivity to frustration and experienced higher levels of maternal invalidation, and these factors interacted to increase risk for teacher-reported externalizing problems. Taken together, these findings highlight multiple avenues for intervention.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Jessica M. Gannon, MD

Current Position: Associate Professor of Psychiatry

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Title: Treatment-Resistant Bipolar Depression; Insulin Resistance; Metformin; Randomized Clinical Trial; Placebo

Author(s): Gannon J^{1,2}, Calkin CV^{3,4,5}, Chengappa KNR^{1,2}, Cairns K⁴, Cooney J³, Alda M^{3,5}, O'Donovan C^{3,5}, Reardon C⁴, Sanches M⁶, Ruzickova M^{2,3}

Affiliation(s): ¹Western Psychiatric Hospital, University of Pittsburgh Medical Center; ²Department of Psychiatry, University of Pittsburgh School of Medicine; ³Department of Psychiatry, Dalhousie University, Faculty of Medicine; ⁴Mood and Metabolism Program, QE II Health Sciences Centre; ⁵Department of Medical Neuroscience, Dalhousie University, Faculty of Medicine; ⁶The Centre for Mental Health and Addiction, Toronto

Introduction: Therapeutic options are limited for Treatment-Resistant Bipolar Depression (TRBD). Insulin resistance (IR) confers increased risk for TRBD. We investigated metformin, an insulin-sensitizer, to reverse IR and improve clinical outcomes in TRBD.

Methods: Using a random-assignment (1:1), intent-to-treat, 2-site, quadruple-masked, parallel group (metformin to 2000 mg/day or placebo) clinical trial design, patients with DSM-5 Bipolar I and II Disorder (BD) and IR received study medication for 26 weeks (February 2016 to October 2019). The primary outcome was the change in depression rating scores (Montgomery-Åsberg Depression Rating Scale, MADRS) at 14 weeks between those who no longer met IR criteria (converters) vs those who still did (nonconverters). Additional outcomes included global assessment of functioning (GAF), clinical global impression (CGI-BP), anxiety (Hamilton Anxiety Rating Scale, HAM-A), and maintenance of improved outcomes up to 26 weeks.

Results: 45 BD patients were randomized to metformin (n=20) or placebo (n=25), and at 14 weeks or later, 11 subjects no longer met IR criteria (n=10 metformin, n = 1, placebo, p=0.0009). These converters experienced significant improvements in MADRS (p = 0.031 to 0.008) and GAF scores (p = 0.045 to 0.008) compared to nonconverters beginning at week 6, sustained to week 26. HAM-A (p = 0.022 at week 14, and 0.019 at week 26) and CGI-BP change scores (p = 0.046 at 26 weeks) significantly favored converters over non-converters. Effect sizes were large for MADRS and GAF (Cohen's d > 1 at 14 and 26 weeks), and large for HAM-A and CGI at 26 weeks. Transient gastrointestinal side effects occurred under both treatment conditions.

Conclusion: Pending replication, this early study suggests that reversal of IR by metformin offers a path out of TRBD. Further characterization of metformin converters with TRBD will prove informative.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Matt Geramita, MD PhD

Current Position: PGY4 Psychiatry Resident

Presenter's Email Address: geramitam2@upmc.edu

Title: Independent and distinct patterns of abnormal lateral orbitofrontal cortex activity during compulsive grooming and reversal learning normalize after fluoxetine

Author(s): Geramita M¹, Manning E², Piantadosi S³, Pierson J¹, Ahmari S²

Affiliation(s): ¹Translational Neuroscience Program, Department of Psychiatry, University of Pittsburgh School of Medicine; ²School of Biological Sciences and Pharmacy, University of Newcastle; ³Center for Neurobiology of Addiction, Pain, and Emotion, University of Washington

Introduction: Patients with obsessive-compulsive disorder (OCD) display disrupted performance and abnormal lateral orbitofrontal cortex (LOFC) activity during reversal learning tasks, yet it is unknown whether compulsions and reversal learning deficits share a common neural substrate. To answer this question, we measured neural activity with *in vivo* calcium imaging in LOFC during compulsive grooming and reversal learning before and after fluoxetine treatment.

Methods: *Sapap3*-knockout (KO) mice were used as a model for OCD-relevant behaviors. *Sapap3*-KOs and control littermates were injected with virus encoding GCaMP6f and implanted with gradient-index lenses to visualize LOFC activity using miniature microscopes. Grooming, reversal learning, and neural activity were measured pre- and post-fluoxetine treatment (18mg/kg, 4 weeks).

Results: Baseline compulsive grooming and reversal learning impairments in KOs improved after fluoxetine treatment. Additionally, KOs display distinct patterns of abnormal LOFC activity during grooming and reversal learning, both of which normalize after fluoxetine. Finally, modulation in response to reversal learning and compulsive behavior are independent, as reversal learning-associated neurons are distributed randomly amongst grooming-associated neurons (i.e. overlap is what would be expected by chance).

Conclusion: In OCD, the LOFC is disrupted during both compulsive behaviors and reversal learning, yet whether these behaviors share common neural underpinnings is unknown. We find that the LOFC plays distinct and independent roles in compulsive grooming and impaired reversal learning and their improvement with fluoxetine. These findings suggest that LOFC plays separate roles in pathophysiology and treatment of different perseverative behaviors in OCD.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Andrew Gerlach, PhD

Current Position: Postdoctoral Scholar

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Title: Networks of Worry - the Complex Neural Underpinning of a Popular Phenotype

Author(s): Gerlach A¹, Karim H^{1,2}, Krafty R³, Aizenstein H^{1,2}, Andreescu C¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Bioengineering, University of Pittsburgh; ³Department of Biostatistics and Bioinformatics, Emory University

Introduction: Worry is a transdiagnostic phenotype encountered in multiple mental disorders and independently associated with increased morbidity, including cognitive impairment and cardiovascular diseases. We investigated the neurobiological basis of worry in older adults by analyzing resting state fMRI from a systems neuroscience perspective.

Methods: We collected resting fMRI on 77 participants (>50 yo) with varying worry severity. We computed region-wise connectivity across the Default Mode Network (DMN), Anterior Salience Network (ASN), and left Executive Control Network (LECN). All 22,366 correlations were regressed on worry severity and adjusted for age, sex, race, education, disease burden, depression, anxiety, rumination, and neuroticism. We employed higher criticism (HC) thresholding, a second-level method of significance testing for rare/weak features, for correlation selection. Aggregate correlations were used to summarize network-level signatures of worry.

Results: Half the relevant intra-network connections are within the DMN. Negative correlations with worry severity dominate throughout the cingulate, temporal lobe, and cuneus, while frontal regions show bidirectional associations with worry. Within the ASN, negative correlations with worry severity abound, particularly in the anterior cingulate, inferior frontal regions, and thalamus. Positive correlations with worry severity in the left posterior cingulate and right temporal lobe and negative correlations in frontal regions are notable within the LECN. Inter-network analysis reveals a rich, but complex pattern of connectivity, again heavily skewed toward connections involving the DMN.

Conclusion: Worry severity is associated with complex resting state intra- and inter-network connectivity signatures independent of other clinical and demographic variables. The majority of the relevant connections involve the DMN. Worry shows an overwhelmingly negative association with the anterior cingulate, temporal lobe, and thalamus and an intricate mix of positive and negative associations with prefrontal regions. Identifying the most salient and unique connections may be useful for targeted interventions for reducing morbidity associated with severe worry in older adults.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Research and Clinical Resources Poster Abstract**

Presenters: Jill Glausier, PhD, Mary Ann Kelly, Victoria Detweiler, Rheana Lipscomb, Matthew Maier, Elyza Pilatowski-Herzing, Abigail Pipcho, Kelly Rogers, Rachael Viehman, Lisa Zimmerman

Current Position: Assistant Professor of Psychiatry and Associate Program Director of the Pittsburgh NIH NeuroBioBank

Presenter's Email Address: glausierjr@upmc.edu

Resource(s): Postmortem human brain tissue from more than 2,000 clinically well-characterized donors

Description: Studies of the postmortem human brain represent an essential element in the effort to characterize the primary pathology and to understand the pathogenesis and pathophysiology of brain disorders, and in turn, to identify and validate targets for novel therapeutic interventions. The University of Pittsburgh NIH NeuroBioBank Brain and Tissue Repository (**Pittsburgh NIH NBB**) is one of six sites in this NIH-funded program whose primary goal is to increase the availability of high-quality, well-characterized human postmortem brain tissue for the research community. The Pittsburgh NIH NBB has over 30 years of continuous experience in the acquisition of postmortem human brain tissue, clinical characterization of donors, and collaboration with investigators to generate rigorous study design and implement cutting-edge approaches to answer experimental questions with this unique resource. Postmortem human brain tissue from the Pittsburgh NIH NBB has successfully been used in studies implementing a variety of methodologies, including genomic, epigenomic, transcriptomic, proteomic, and light and electron microscopic approaches to investigate disease effects of numerous psychiatric and neurologic disorders, as well as the effects of ageing and normal development.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Jill R. Glausier, PhD

Current Position: Assistant Professor

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Title: Metabolomic Measures of Oxidative Stress in the Dorsolateral Prefrontal Cortex, Dorsal Striatum and Ventral Striatum in Schizophrenia

Author(s): Glausier J, Lewis D

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Oxidative stress occurs when antioxidant systems, such as glutathione (GSH), are overwhelmed by pro-oxidant species, resulting in damage to fundamental cellular components and impaired neuronal functioning. Insufficient GSH is proposed as a pathogenic mechanism contributing to cortical and subcortical dysfunction in schizophrenia (SZ). To investigate this idea, we quantified markers of the GSH antioxidant system and oxidative damage to lipids in the dorsolateral prefrontal cortex (DLPFC), dorsal striatum (DS) and ventral striatum (VS) in SZ subjects.

Methods: Brain specimens from 50 subjects were processed for metabolomic analyses. DLPFC grey matter, DS and VS were utilized for targeted liquid chromatography tandem mass spectrometry (LC-MS/MS) to quantify the abundance of free GSH and glutathione disulfide (GSSG). LC-MS was utilized to quantify the abundance of malondialdehyde (MDA), a product of oxidative damage to lipids.

Results: For GSH abundance, a trend-level significant main effect of SZ diagnosis was present ($F_{1,47}=3.6$, $p=0.06$). Contrary to the observed effects of oxidative stress, the SZ disease effect was associated with greater GSH in the DS ($d=+0.43$) and VS ($d=+0.51$), and no effect in the DLPFC ($d=-0.04$) relative to UC. No significant main effect of SZ was identified for GSSG ($F_{1,48}=0.76$, $p=0.4$) or MDA abundance ($F_{1,48}=0.6$, $p=0.5$).

Conclusion: Contrary to the effects of oxidative stress on GSH abundance, we identified a greater concentration of free GSH in the DS and VS in SZ and no effect of SZ on GSH abundance in the DLPFC. These findings suggest that the GSH system can increase antioxidant capacity in SZ. The lack of a significant SZ disease effect on MDA, a product of lipid oxidation, further suggests that the GSH antioxidant system is appropriately defending against oxidative damage. Together, these data suggest that an impaired GSH antioxidant system and increased cellular oxidative damage may not represent common pathogenic mechanisms in SZ.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Angela N. Griffo, BS

Current Position: Research Project Assistant

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Title: Transdiagnostic Determinates of Hippocampal Atrophy in Cognitive Function and Trauma

Author(s): Griffo A, Price R, Spotts C

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Previous research found that psychiatric disorders such as depression are associated with greater hippocampal atrophy compared to healthy controls. Impaired cognitive functioning and experienced trauma are also associated with greater atrophy. There is a lack of research investigating how the machine learning-based algorithm of hippocampal volume integrity (HVI) may provide insight to the heterogeneity of psychiatric disorders, suggesting a transdiagnostic methodology to compare and determine associations unique to depression, anxiety, and compulsive disorders.

Methods: HVI obtained from MPRAGE files were analyzed on 108 depressed patients who scored ≥ 25 on the Montgomery Scale for Depression Symptoms (MADRS), 69 compulsive patients who had clinically significant compulsions according to the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS), and 77 anxious patients who scored ≥ 45 on the Spielberger State-Trait Anxiety Inventory (STAI). Life Events Checklist (LEC) and HVI scores were compared between anxious and depressed groups. Tasks measuring cognitive function (Stroop Task, NIH Toolbox Comparison Processing Speed Test) were used to determine correlates with HVI in the anxious and depressed groups.

Results: Higher HVI in both the left and right hippocampus correlated with better processing speed in depressed patients. However, only the left hippocampus was associated with better performance in the anxious group. There was a significant correlation between trauma and HVI in the depressed sample, but not in the anxious sample. Results indicated that HVI did not significantly differ across study samples.

Conclusion: HVI can provide a novel framework to elucidate associations across psychiatric disorders. It can be used to investigate the mechanisms that may contribute to the integrity of the hippocampus such as trauma, and the reflection of the hippocampus in cognitive functioning. In this study, higher HVI is associated with better cognitive performance on neuropsychiatric measures in the depressed and anxious samples. Lower HVI is associated with more experienced trauma in the depressed sample.

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenter: Melanie Grubisha, MD, PhD

Current Position: Assistant Professor of Psychiatry

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Resource(s): Neurodevelopmental model to assess the impact of a myelin-associated signaling pathway on dendritic architecture across adolescence

Description: Schizophrenia (SZ) is a highly heritable, polygenic disorder with onset of clinical symptoms during late adolescence/early adulthood. The late neurodevelopmental onset may result from a mechanism by which a genetic vulnerability present since birth interacts with normal adolescent development such that pathology emerges during or after adolescence. This substantial time window provides ample opportunity for intervention if the specific molecular mediators responsible for this phenomenon can be identified. One of the most highly replicated postmortem findings in SZ is reductions in dendritic length and complexity in cortical pyramidal cells, which provides promise as a unique and specific targetable pathology. Normally, dendrite structure appears stable during adolescence and adulthood due to a dynamic balance of opposing growth and retraction pathways. Recent work has identified that Nogo receptor 1 (NGR1) signaling shifts that balance, causing net dendritic regression in pyramidal cells. Capitalizing on that finding, I found that a ligand for NGR1 that increases in expression across adolescence, Oligodendrocyte Myelin Glycoprotein (OMGp), induces net dendritic regression. I further demonstrated that OMGp/NGR1 induced dendritic regression requires the KAL9 isoform of the KALRN gene. OMGp/NGR1/KAL9 induced dendritic regression is further increased by a naturally occurring gain-of-function mutation in KAL9, KAL9-PT.

This has led to the development of several key resources:

1. A genetic mouse model with knock-in of KAL9-PT mutation, which results in enhanced dendritic regression across adolescence in cortical pyramidal neurons
2. Tools to manipulate OMGp expression *in vitro*, including purified OMGp ligand and siRNA directed against OMGp to knockdown endogenous expression
3. A phosphoproteomics dataset characterizing downstream mediators of enhanced OMGp signaling in cortical neurons *in vitro*
4. Ongoing development of an OMGp conditional knockout mouse that will allow for selective modulation of OMGp across adolescence

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Karen Jakubowski, PhD

Current Position: Postdoctoral Scholar

Presenter's Email Address: jakubowskik@upmc.edu

Title: Sexual Violence and Cardiovascular Disease Risk: A Systematic Review and Meta-Analysis

Author(s): Jakubowski KP¹, Murray V², Stokes N³, Thurston RC^{1,4,5}

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Medicine, University of Pittsburgh School of Medicine; ³Heart and Vascular Institute, University of Pittsburgh Medical Center; ⁴Department of Epidemiology, University of Pittsburgh Graduate School of Public Health; ⁵Department of Psychology, University of Pittsburgh

Introduction: Cardiovascular disease (CVD) is a leading cause of death among adults. Over 35% percent of women worldwide report lifetime exposure to sexual violence. While psychosocial factors broadly have been linked to CVD risk, it is unclear if a history of sexual violence is associated with increased risk for CVD. This study employed quantitative meta-analysis to investigate the association between sexual violence and CVD risk and potential moderators of this relationship, including characteristics of participants, sexual violence, analyses, and CVD risk outcomes.

Methods: PubMed and PsycINFO databases were searched through March 1, 2021. Included articles had a measure of sexual violence and at least one cardiovascular outcome (i.e., clinical CVD, subclinical CVD, select CVD risk factors) in women and men aged 18 or older. Data were expressed as odds ratios (OR) or hazard ratios (HR) with 95% confidence intervals (CI) extracted from fully-adjusted models. OR and HR effects were pooled separately, due to differing interpretations, using random effects meta-analysis. Heterogeneity of effects was tested using Cochran's Q test.

Results: Overall, 45 articles based on 830,579 adults (77.1% women) were included (113 individual effects expressed as OR and 9 individual effects expressed as HR). Effects were largely drawn from midlife samples. Sexual violence was related to adult CVD risk (OR [95%CI] = 1.18 [1.11-1.24]; HR [95%CI] = 1.22 [1.05-1.42]). Larger effects for associations of sexual violence to CVD risk were observed for: (1) sexual violence occurring in childhood or over the lifecourse (versus adulthood only) and (2) clinical CVD outcomes (versus subclinical CVD or CVD risk factors).

Conclusion: Adults with a history of sexual violence, particularly in childhood, demonstrate greater CVD risk relative to those without this history. Results highlight the importance of addressing sexual violence in CVD risk reduction efforts.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Hunsica Jayaprakash

Current Position: Undergraduate Department of Computer Science

Presenter's Email Address: hjj6@pitt.edu

Title: Hemispheric Amyloid Asymmetry and its relationship with cerebral metabolism and grey matter density in cognitively normal, older adults

Author(s): Jayaprakash H^{1,2}, Mizuno A³, Aizenstein H^{3,4}, Karim H^{3,4}

Affiliation(s): ¹Department of Computer Science, University of Pittsburgh; ²Center for Neural Basis and Cognition; ³Department of Psychiatry, University of Pittsburgh School of Medicine; ⁴Department of Bioengineering, University of Pittsburgh

Introduction: Alzheimer's disease (AD) is a neurodegenerative disorder characterized by loss of neurons. Neurodegeneration has been associated with beta amyloid (A β) and past studies have found associations between asymmetric A β accumulation and asymmetric cerebral metabolism in preclinical AD. No studies have reported early changes in A β asymmetry and its effects on grey matter integrity.

Methods: We recruited 93 (mean age = 76.4 \pm 6.1 years) cognitively normal adults who underwent magnetic resonance imaging (MRI) and positron emission tomography (PET) with Pittsburgh compound B (PiB) and Fluorodeoxyglucose (FDG) tracers (to estimate A β and glucose metabolism, respectively). We conducted voxel-wise paired t-test on PiB (left vs. right hemispheres) and identified 26 regions that differed in A β . We extracted gray matter volume, FDG, and PiB regional values from each region and hemisphere. We conducted paired t-tests on each region for FDG and gray matter volume to identify whether they differed significantly. We then conducted correlations between asymmetry indices for each region that had significant PiB, FDG, and gray matter volume differences.

Results: We found several regions that had significant rightward asymmetry including prefrontal cortex, temporal cortex, insula, parahippocampus, caudate, and putamen. All of these regions showed significant gray matter rightward asymmetry, however most of these regions also showed significant FDG asymmetry excluding the caudate, orbital cortex, medial frontal gyrus, and superior temporal gyrus. We found a significant positive correlation in asymmetry indices of PiB and FDG (both rightward) but only in the superior frontal gyrus, $r(82) = 0.38$, $p < 0.005$ (FDR corrected).

Conclusion: Our results indicate that glucose metabolism is dynamic throughout disease progression and serves as a compensatory pathway that may maintain cognitive function. Further studies are required to investigate the role of the prefrontal regions and the effects of rightward PiB and FDG asymmetry in AD progression.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Arabella Johnson

Current Position: Undergraduate Student Researcher

Presenter's Email Address: aaj28@pitt.edu

Title: Normed Versus Raw Hippocampal and Entorhinal Volumes as Predictors of Memory Performance

Author(s): Johnson A^{1,2}, Raskin B¹, Aizenstein H^{3,4}, Mizuno A³, Weinstein A³

Affiliation(s): ¹Department of Neuroscience, University of Pittsburgh; ²Department of Psychology, University of Pittsburgh; ³Department of Psychiatry, University of Pittsburgh School of Medicine; ⁴Department of Bioengineering, University of Pittsburgh

Introduction: Alzheimer's disease (AD) is associated with reduced hippocampal and entorhinal volume and function, yielding decreased memory performance. It is unclear whether to reference atrophy by raw volume measurements or age- and sex- adjusted normative values. We examined associations of raw and normed volume of medial temporal structures with memory performance in AD diagnostic groups.

Methods: We analyzed the ADNI2 baseline data of four diagnostic groups [cognitively normal (CN), subjective memory complainers (SMC), mild cognitive impairment (MCI), AD]. Normed brain volumes were computed from the means and standard deviations of CN participants' hippocampus and entorhinal volumes for two age (cutoff = 75) and sex groups. We conducted linear regressions to examine associations between normed volume and memory function [Rey Auditory Verbal Learning test (RAVLT)], controlling for intracranial volume (ICV). Models with raw volume included additional demographic (age, sex) covariates.

Results: Greater normed hippocampal volume was associated with greater RAVLT scores in AD ($t=2.56$, $p=0.03$, Bonferroni corrected) and MCI ($t=5.49$, $p<0.001$), but not in SMC ($t=-1.13$, $p=0.78$). Raw hippocampal volume was associated with RAVLT scores only in MCI ($t=5.06$, $p<0.001$). Greater normed and raw entorhinal volumes were associated with greater RAVLT scores only in MCI (norm: $t=5.10$, $p<0.001$; raw: $t=4.95$, $p<0.001$). Additionally, sex was a significant predictor of RAVLT scores in MCI (norm: $t=-2.88$, $p=0.01$, raw: $t=-2.91$, $p=0.012$).

Conclusion: Raw hippocampal volumes predicted memory performance only in MCI; however, normed hippocampal volumes were predictive across a broader spectrum of AD stages. Both normed and raw entorhinal volumes predicted memory performance only in MCI. Using raw volumes allowed examination of other potentially important factors (i.e., sex differences). Normed volumes of medial temporal structures may be useful for capturing clinically relevant information for diagnostic purposes, whereas raw volumes may be more useful for research investigations of cognitive function in older adults.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Kevin M. Kahru

Current Position: Medical Student

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Title: Associations of rest-activity rhythms with depression symptoms among retired day- and night-shift workers

Author(s): Kahru KM, Chin BN, Buysse DJ, Smagula SF

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Depression is common and consequential in recent retirees. Rest-activity rhythm (RAR) disturbances relate to depression symptoms and, since they are potentially modifiable, may provide a behavioral target for depression interventions. But specific RAR factors that are associated with depression symptoms in key subgroups, like recent retirees, have not yet been identified. Specific retirees may be at increased risk for RAR disturbances and related depression, such as the 1 in 5 Americans who were exposed to night-shift work. We hypothesized that later, irregular, RARs would relate to depression symptoms; but that RAR-depression symptom relationships may also vary based on past night-shift work exposure.

Methods: We examined the RAR correlates of depression in a sample of retired day ($n=76$, mean age=68.7, standard deviation (SD)=5.5) and night shift workers ($n=63$, mean age=67.7, SD=5.1). We assessed RARs using non-parametric indices of strength (relative amplitude), stability (inter-daily stability), fragmentation (intra-daily variability), and activity timing (average hourly activity levels). Depression symptoms were defined as Center for Epidemiologic Studies - Depression Scale score ≥ 8 .

Results: After correcting for multiple comparisons, being relatively less active between 1 PM and 5 PM was the only unique correlate of having depression symptoms (False Discover Rates <0.05). This association had a medium-to-large effect size (Cohen's $d=0.63$). Post-hoc analyses indicates that these associations of depression symptoms and afternoon inactivity were apparent only in former night-shift workers (Cohen's $D=1.28$) and not former day-shift workers (Cohen's $D=0.19$).

Conclusion: Our observations contrast with prior findings that the relative deficit in activity that is associated with depression disproportionately occurs in morning hours. Thus, prior exposure to night shift work may alter the behavioral pattern associated with depression symptoms. Behavioral interventions for depression in retirement may benefit from considering prior shift work exposure alongside patients individual RARs.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Joseph Kazan, MD

Current Position: Postdoctoral Scholar

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Title: Temporal relations among emotional and behavioral factors in late-life depression during the COVID-19 Pandemic

Author(s): Kazan J¹, Gerlach A¹, Mizuno A¹, Aizenstein H^{1,2}, Stahl S¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Bioengineering, University of Pittsburgh

Introduction: Late-life depression is associated with social isolation and poor quality of life. The COVID-19 pandemic created unique psychological stressors and disrupted social support systems, which may have uniquely impacted older adults' depressive symptomatology. We aimed to study the relationship between emotional (depression, anxiety, stress) and behavioral (sleep and physical activity) factors over time in older adults with a history of depression.

Methods: We conducted weekly assessments over 12 weeks with 20 participants aged 60 years and older with a previous diagnosis of Major Depressive Disorder. Assessments consisted of telephone/zoom interviews and included the following five standardized questionnaires: Montgomery-Åsberg Depression Rating Scale, Hamilton Anxiety Rating Scale, Perceived Stress Scale, Insomnia Severity Index, and Physical Activity Scale for the Elderly. We employed a depression-focused cross-lagged panel model (CLPM) to examine within-week correlations among the five measures.

Results: The depression-focused CLPM identified statistically significant week-to-week self-predictive effects for each of the measures: depression ($\beta = 0.964, P < .001$); anxiety ($\beta = 0.728, P < .001$); stress ($\beta = 0.650, P < .001$); sleep ($\beta = 0.647, P < .001$); and physical activity ($\beta = 0.328, P < .001$). Depression was also found to be a strong predictor of stress ($\beta = 0.254, P < .01$), insomnia ($\beta = 0.224, P < .05$), and physical activity ($\beta = -0.212, P < .05$) the following week. No other cross-measure predictions were statistically significant.

Conclusion: Our study highlights the protracted negative effects of depression on the emotional and behavioral wellbeing of older adults and supports the need for longitudinal assessments and targeted interventions for late-life depression.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Kyle D. Ketchesin, PhD

Current Position: Assistant Professor of Psychiatry

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Title: Diurnal Alterations in Gene Expression Across the Human Dorsal and Ventral Striatum in Psychosis

Author(s): Ketchesin KD¹, Zong W², Hildebrand MA¹, Seney ML¹, Scott MR¹, Cahill KM², Shankar VG¹, Glausier JR¹, Lewis DA¹, Tseng GC², McClung CA¹

Affiliation(s): ¹Translational Neuroscience Program, Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Biostatistics, University of Pittsburgh

Introduction: Schizophrenia is a debilitating psychiatric disorder associated with major disruptions in sleep and circadian rhythms. A recent study from our group used a time-of-death analysis of RNA-seq data and found that subjects with schizophrenia show altered gene expression rhythms in the cortex. However, the role of rhythms in other regions associated with core symptoms of schizophrenia remains unknown. Here, we investigate how gene expression rhythms are altered across the dorsal and ventral striatum in subjects with psychosis.

Methods: RNA-seq was performed on nucleus accumbens (NAc), caudate, and putamen samples from subjects with psychosis (n=34) or unaffected comparison subjects (n=34). Both differential expression and rhythmicity analyses were performed to determine diurnal alterations in gene expression in psychosis subjects relative to comparison subjects.

Results: Threshold-free comparisons revealed that differential expression between psychosis and comparison subjects was largely similar across striatal regions. However, at stringent p-value and fold change cutoffs, region-specific differences in pathway enrichment emerged. Notably, in the NAc, there was a downregulation in mitochondrial-related transcripts in subjects that died at night. Rhythmicity analyses revealed a substantial loss of rhythmicity in core circadian clock genes across the striatum in psychosis subjects. Region-specific changes in rhythmicity were observed in the NAc, including a loss of rhythmicity in small nucleolar RNAs and a gain of rhythmicity in glutamatergic signaling. Rhythmicity comparisons between regions showed a striking degree of overlap between the caudate and putamen in psychosis subjects.

Conclusion: Multiple gene expression differences were identified in the striatum in psychosis subjects, as well as changes in rhythmic gene expression that could underlie disease pathology or treatment response. Some of these changes are specific to particular regions, such as the downregulation in mitochondrial-related transcripts at night in the NAc, while others are common to all regions, including a loss of rhythmicity in circadian clock genes.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Sam-Moon Kim, PhD

Current Position: Postdoctoral Associate

Presenter's Email Address: sak248@pitt.edu

Title: Alterations in adolescence sleep and circadian rhythm as potential factors that increase risk of substance use disorders

Author(s): Kim S-M^{1,2}, Cerwensky A^{1,2}, Wright M^{1,2}, Egazarian A^{1,2}, Almeida A^{1,2}, Zeak J^{1,2}, Aerni S^{1,2}, Migias Y^{1,2}, Suppo J^{1,2}, Sanders B^{1,2}, Seney M^{1,2}, Huang Y^{1,2}, Torregrossa M^{1,2}, McClung C^{1,2}

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine,

²Center for Adolescent Reward, Rhythms, and Sleep (CARRS), University of Pittsburgh

Introduction: Circadian clocks regulate reward-related neuronal mechanisms and disruptions to these clocks increase substance use. In turn, drug abuse disrupts time-keeping mechanisms of circadian clocks in reward circuits, thus contributing to substance use disorders (SUDs). Adolescence is a vulnerable period for both circadian disruption and development of SUDs because it is a transitional stage accompanied by more reward driven, impulsive, and sensation seeking behaviors. The reciprocal interaction between circadian clocks and reward pathways is a critical aspect to development of SUDs in adolescence, but the molecular mechanisms underlying this link are not fully understood. Therefore, as a part of CARRS, our primary goal is to understand how genetically abnormal rhythms and environmental rhythm disruptions contribute to vulnerability to substance abuse during adolescence.

Methods: To understand natural variations in circadian traits, we measured behavioral rhythms and sleep in Heterogenous Stock (HS) outbred adolescent rats. We also utilized primary fibroblasts from rats with longer period and lower amplitude to test potential therapeutic compounds for their ability to modulate molecular rhythmicity. In addition, we collected the prefrontal cortex and nucleus accumbens following acute sleep disruption to measure alterations in gene expression using RNA sequencing.

Results: We found that HS rats displayed high circadian phenotypic diversity compared to conventional rat crosses presumably due to their genetic heterogeneity. We observed a wide range in period and daily sleep percentage in these rats (23.76 - 24.18 hour and 32 - 56% respectively). Our preliminary test showed that previously identified compounds that enhance rhythms in mouse culture produce similar effects on rat rhythms. In addition, our transcriptome study will provide further useful information for elucidating the mechanisms underlying reward and circadian disruption during adolescence.

Conclusion: Our data demonstrate that genetic diversity contributes to phenotypic variability in circadian rhythm and circadian disruption alters reward functions during adolescence.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Antonija Kolobaric, ScB

Current Position: Graduate Student, Center for Neuroscience

Presenter's Email Address: ank223@pitt.edu

Title: Are all anxieties created equal? Stress-related networks and anxiety phenotypes in old age

Author(s): Kolobaric A¹, Karim H^{2,3}, Banihashemi L², Mizuno A², Aizenstein H^{2,3}, Andreescu C²

Affiliation(s): ¹Center for Neuroscience, University of Pittsburgh; ²Department of Psychiatry, University of Pittsburgh School of Medicine; ³Department of Bioengineering, University of Pittsburgh

Introduction: Late life anxiety disorders are associated with worsening cognitive decline, and increased risk of cardiovascular and autoimmune diseases. Despite high prevalence, various anxiety disorders such as generalized anxiety disorder (GAD) are often undiagnosed and untreated. Symptoms such as severe worry or rumination respond poorly to standard treatment and drive the morbidity associated with GAD. We explored the association of these distinct anxiety phenotypes (worry/rumination/global anxiety) with functional connectivity markers in networks involved in both emotion regulation and stress.

Methods: We recruited participants with varying levels of worry (N=94) to undergo assessments and resting state fMRI. Following standard preprocessing, we computed seed based connectivity for the bed nucleus of the stria terminalis (BNST), the paraventricular nucleus (PVN), habenula, and left/right amygdala (AMG). We extracted regions for each network based on their canonical networks in 1000 subjects (neurosynth). Using connectivity and clinical factors, we fit cross-validated elastic net models to predict participants scores on: Penn State Worry Questionnaire, Response Styles Questionnaire, Hamilton Anxiety Rating Scale, and Perceived Stress Scale.

Results: We found that greater worry was associated with greater PVN-subgenual ACC, parahippocampal (PHC), and olfactory and AMG-PHC connectivity. We found that greater rumination was associated with greater left AMG-PHC and lower left AMG-OFC connectivity. Additionally, anxiety and stress had distinct patterns of connectivity.

Conclusion: Our study demonstrated that each of the investigated anxiety phenotypes is associated with a unique set of connectivity markers. This may aid in the development of future targeted interventions.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Emily K. Leiker, PhD

Current Position: Postdoctoral Associate

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Title: Reduced amygdala activity to positive memories as a marker of depression risk

Author(s): Leiker E¹, Compère L¹, Barb S², Lazzaro S², Canovali G², Siegle G¹, Young K¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²University of Pittsburgh Medical Center

Introduction: Major Depressive Disorder (MDD) is prevalent and pervasive, with earlier onset predicting greater symptom severity, chronicity, and likelihood of treatment resistance. Targeting individuals at high-risk of developing MDD for early intervention holds promise for disease prevention. We previously identified a biomarker for MDD involving blunted amygdala hemodynamic activity during positive autobiographical memory (AM) recall, that can be successfully modulated with neurofeedback to promote clinically significant improvements. The present study evaluates if this biomarker is detectable in healthy individuals at high-risk for developing MDD, to inform its potential utility as a therapeutic target for earlier neurofeedback intervention aimed at prevention.

Methods: Healthy young adults (ages 18-25) with high familial risk for MDD (high-risk; N=10) and those with no familial risk (low-risk; N=23) completed an emotional AM recall task during fMRI. All participants completed a diagnostic interview confirming they did not meet diagnostic criteria for MDD as a condition of enrollment.

Results: Healthy individuals at high-risk for MDD exhibited reduced amygdala hemodynamic activity during positive AM recall compared to low-risk individuals. This was accompanied by reduced activity in regions implicated in self-referential processing and episodic memory retrieval (including anterior/posterior cingulate, inferior and superior medial frontal gyrus, and hippocampus), but elevated activity in regions implicated in memory search processes and interoception (inferior parietal lobule and insula).

Conclusion: We show for the first time that young adults at high-risk for MDD show a reduced amygdala response during positive AM recall similar to that seen in currently depressed patients. This suggests reduced amygdala responsivity to positive AM recall is an endophenotype for MDD and is a potential causal mechanism for depression onset. It may therefore be a promising target for earlier neurofeedback interventions intended to prevent disease onset and save these individuals from a lifetime of illness.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Madison Lewis

Current Position: Graduate Student Researcher

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Title: HCP-atlas Based Network Reveals Prefrontal-Temporal-Insular Hubs in First-Episode Psychosis and Heteromodal Association Hubs in Controls

Author(s): Lewis M, Theis N, Muldoon B, Prasad K

Affiliation(s): University of Pittsburgh, Swanson School of Engineering, Department of Bioengineering, School of Medicine, Department of Psychiatry

Introduction: Dysconnectivity of brain network in psychosis is elusive despite intense research over the last few decades. We quantified connectivity patterns in a structural covariance network (SCN) constructed from the Human Connectome Project (HCP)-based atlas which includes 358 regions based on functional and structural connectivity on 79 first-episode antipsychotic-naïve psychosis (FEAP) patients in comparison with 68 healthy controls.

Methods: SCNs were constructed for gray matter volume, surface area, and cortical thickness for each study group. Using an intensity threshold based on small worldness, 21 thresholds between 0.175-0.275 were applied to the networks, and hubs were determined at each threshold. At the five thresholds, degree, clustering coefficient, betweenness centrality, eccentricity, characteristic pathlength, assortativity, and modularity were analyzed. Four network simulations were also conducted to test network resilience.

Results: Schizophrenia showed lower degree nodes, higher clustering coefficient and betweenness centrality of the volume SCN with no differences in mean eccentricity, pathlength, assortativity and modularity. Thickness SCN showed similar graph property differences as the volume SCN but not the surface area SCN. More hubs were found in the volume and surface area SCN of schizophrenia patients than in controls but not in cortical thickness SCN. No hubs were shared between the FEAP and the controls in the volume or cortical thickness networks. Two hubs were shared between the groups in the surface area networks. The FEAP SCN showed lower resilience to network attack simulations.

Conclusion: Because of the low degree, high clustering, and $\approx 25\%$ more hubs, the FEAP SCN appears to be sparsely connected. The FEAP SCN has prefrontal-temporal-insular hubs whereas controls have heteromodal association hubs. This supports FEAP patient's lower cognitive and emotional function. The FEAP SCN's decreased resilience to attack indicates a compromised network.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Julia Longenecker, PhD

Current Position: Postdoctoral Fellow

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Title: The Influence of Attention on Steady-state Auditory Evoked Potentials in First-Episode Psychosis

Author(s): Longenecker J^{1,2}, Coffman B², Curtis M², Ren X², Torrence N², Fischel V², Seebold D², Wang Y², Farris R², Salisbury D²

Affiliation(s): ¹ VISN 4 Mental Illness Research Education and Clinical Center (MIRECC), VA Pittsburgh Healthcare System; ² Clinical Neurophysiology Research Laboratory, Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Psychosis is characterized by broad auditory deficits that may be exacerbated by difficulty modulating attention. The gamma-band auditory steady state response (ASSR) is evoked by local auditory cortex circuit activity and enhanced by attention, making it ideal for investigating the combined effects of these processes. This study investigates whether ASSR is attenuated in first-episode psychosis (FEP), and differentially modulated by attentional processes.

Methods: Matched FEP (n=32) and healthy comparison participants (n=32) underwent MEG recording during an auditory task which required them to either attend or ignore 40Hz click train stimuli. Average ASSR evoked power was calculated in a narrow gamma band (35-45Hz) from 100-500ms post-stimulus using the Morlet wavelet transform then applied to a common source model using Human Connectome Project parcellation. Regions of interest were the primary auditory cortex (A1, lateral belt, medial belt, parabelt, retroinsular) and the auditory association cortex (A4, A5, dorsal posterior superior temporal sulcus).

Results: General Linear Models showed stronger ASSR during attention (versus ignore) ($F_{1,65}=6.20$, $p<.01$, $\eta^2=.09$) and in the right hemisphere ($F_{1,65}=7.77$, $p<.01$, $\eta^2=.11$) for primary auditory cortex regions. There was a hemisphere by group effect for auditory association cortex regions, with reduced ASSR in left hemisphere of FEP ($F_{1,65}=4.55$, $p<.01$, $\eta^2=.06$). A three-way interaction of group x attention x hemisphere was observed across all regions, with power modulation greatest in right hemisphere during attend for controls ($p<.05$, $\eta^2=.08-10$).

Conclusion: Auditory gamma deficits are present in early psychosis, with reduced modulation of lateralized response and attention processes that could contribute to perceptual distortions.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Fran López-Caballero, PhD

Current Position: Postdoctoral Associate

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Title: Neural generators of Pitch and Duration MMN deficits in first episode psychosis at baseline, 3, and 6 months

Author(s): Lopez-Caballero F, Wang Y, Seebold D, Farris R, Fishel V, Torrence N, Coffman B, Salisbury D

Affiliation(s): Clinical Neurophysiology Research Laboratory, Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Mismatch Negativity (MMN) is an auditory event-related potential reflecting the pre-attentive detection of novel non-predicted stimuli. It is considered a biomarker of cortical dysfunction in schizophrenia (SZ) because it is severely reduced to pitch (pMMN) and to duration (dMMN) deviant stimuli, but it is less clear if MMN is reduced in first episode schizophrenia, and if MMN shows progressive impairment with disease course.

Methods: We investigated the neural generators of pMMN and dMMN combining EEG and MEG recordings in 30 first episode SZ patients (FE) and 28 healthy controls (C) at baseline and 3- and 6-month follow-ups. We projected MEG inverse solutions into different areas within the auditory cortex, parcellated using Human Connectome Project pipelines.

Results: Preliminary results at the EEG and MEG sensor level reveal that, while pMMN does not differ between C and FE at baseline, it is progressively reduced in FE after 3 and 6 months. Source activity, however, suggests activity in left A1 area in response to pMMN is impaired in patients already at baseline. For dMMN, results from scalp EEG and MEG showed a reduced MMN in FE at baseline that worsens at 3 and 6 months. Source reconstruction results suggest this progressive reduction at the scalp is driven by right A1.

Conclusion: Our results indicate that the pre-attentive processing of sound features along the first 6 months after a first episode of psychosis is affected following different patterns for pitch and duration, with processing of sound duration being affected earlier and more severely. Furthermore, the underlying pathophysiology of both pitch and duration MMN reduction is centered in bilateral A1, but duration MMN progressive deficits along the course of the disease are right-hemisphere selective.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Elizabeth A. McGuier, PhD

Current Position: Assistant Professor of Psychiatry

Presenter's Email: millerea3@upmc.edu

Title: Multidisciplinary team functioning and performance in Child Advocacy Centers: Associations with implementation outcomes

Author(s): McGuier E¹, Rothenberger SD¹, Byrne K², Campbell K², Keeshin B², Kolko D¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²University of Utah

Introduction: Child Advocacy Centers (CACs) use multidisciplinary teams (MDTs) to coordinate interagency responses to child abuse allegations. In this team-based setting, implementation of new practices is likely to be affected by teamwork quality. This study tests associations between teamwork and implementation outcomes during statewide implementation of a standardized mental health screening/referral protocol in CACs.

Methods: MDT members (N = 433) from 21 CACs completed 5 validated team functioning measures (Affective: liking/trust, psychological safety; Behavioral: learning behavior, coordination about mental health care; Cognitive: clear direction) and 2 team performance measures (overall performance; mental health care quality). Implementation outcomes were the protocol's acceptability, appropriateness, and feasibility. Team members rated all measures on Likert scales. Implementation timing varied across CACs; the survey occurred 1-18 months after initial training. The first three models tested associations of team functioning with implementation outcomes. Then we tested associations of each team performance measure with outcomes. Multilevel models accounted for clustering within CACs.

Results: For feasibility, there were significant ($p < .05$) associations with liking/trust (unstandardized $B = .19$) and coordination about mental health care ($B = .23$). Similarly, for acceptability and appropriateness, there were marginal ($p < .10$) associations with liking/trust ($B = .17$; $B = .16$) and significant associations with coordination about mental health care ($B = .27$; $B = .22$). Psychological safety, learning behavior, and clear direction were not associated with any outcome, perhaps because of high intercorrelations between team functioning measures (r 's = .45-.71). Team member-rated performance was significantly associated with acceptability ($B = .10$), appropriateness ($B = .10$), and feasibility ($B = .09$). Similarly, mental health care quality was significantly associated with acceptability ($B = .15$), appropriateness ($B = .18$), and feasibility ($B = .24$).

Conclusion: Team performance and aspects of affective and behavioral team functioning are associated with perceived acceptability, appropriateness, and feasibility of a mental health screening protocol in a multidisciplinary team-based setting. Implementation strategies targeting teamwork may improve teams' capacity to implement evidence-based practices and service quality in team-based settings.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Bridget McGuigan

Current Position: Undergraduate Researcher

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Title: Cortical Thickness Influenced by Gene Expression in Schizophrenia Patients: A Study Utilizing the HCP Atlas.

Author(s): McGuigan B¹, Santini T², Prasad KM^{1,2}

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Bioengineering, University of Pittsburgh Swanson School of Engineering

Introduction: Gene expression is one of many different factors that influence schizophrenia. Gene expression within schizophrenia has also been implicated to lead to reductions in cortical volume and thickness. We examined the relationship between gene expression and cortical measures in first-episode anti-psychotic-naïve psychosis schizophrenia patients (FEAP) (n=85) and healthy control subjects (n=81) using the Human Connectome Project (HCP) atlas and MRI data (1.5T T1-weighted acquisitions).

Methods: The MRI images were parcellated using Freesurfer and mapped into the HCP atlas (360 cortical regions). The average cortical thickness, surface area, and total grey matter volume of each parcellation were extracted. Publicly available cortical gene expressions (Allen Brain Atlas) from 6 donors were also mapped onto the HCP atlas; 20 regions contained expression data from all 6 donors. Only the genes with a mean correlation coefficient of their expression greater than 0.5 among the 6 donors for the 20 common HCP regions were included (n=1,156). Partial correlation values were compared using MANOVA with false discovery rate corrections.

Results: Cortical thickness was the only cortical measure to provide significantly correlated genes (n=1,017). A number of these genes were correlated in both patients and controls (n=900). Some genes unique to FEAP are involved in serotonin receptor signaling (*HTR2C*), GABA receptor signaling (*GABRA1*, *GABRD*), sphingosine metabolism, and ceramide degradation (*NAAA*). Some genes unique to controls are involved in growth hormone signaling (*CEBPA*, *ONECUT1*), circadian rhythm signaling (*NR1D1*), and glucocorticoid signaling (*MYC*, *RARB*). Genes correlated to cortical thickness in FEAP are involved in neurotransmission, whereas genes correlated in controls are involved in transcription regulation.

Conclusion: Genes involved in neurotransmission may influence changes to cortical measures, such as cortical thickness, in anti-psychotic-naïve psychosis schizophrenia patients, whereas genes involved in transcription regulation potentially play a role in changes to cortical measures in healthy controls.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Shane McKeon, BS

Current Position: Graduate Student Researcher

Presenter's Email Address: sdm63@pitt.edu

Title: Development of EEG-derived spectral processing of working memory through adolescence

Author(s): McKeon S^{1,2}, Calabro F^{1,2,3}, Luna B^{2,3}

Affiliation(s): ¹Department of Bioengineering, University of Pittsburgh; ²The Center for the Neural Basis of Cognition; ³Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Adolescence is the stage of development characterized by neurodevelopmental specialization that impacts cognition and decision making. The brain undergoes important maturational processes that optimize neural processing and allow specialization of cognitive functioning¹. Simultaneously, changes in the relative prevalence of inhibitory (Gamma-Aminobutyric Acid, GABA) and excitatory (glutamate) signaling mechanisms in prefrontal cortex suggest changes in excitatory/inhibitory (E/I) balance which may contribute to developmental changes in behavior^{2,3}. The interplay of GABA and glutamate signaling plays a role in the generation of high frequency oscillations measured through electroencephalogram (EEG). In the current study we focus on assessing age-related changes in the transient frequency band activity from EEG in the frontal, occipital, and parietal lobes, as well as the entire cortex, during a working memory task, in order to characterize normative developmental trajectories of these processes through adolescence.

Methods: We have acquired data from 148 subjects spanning 10 to 30 years of age (mean age = 19.412 +/- 5.512 years, 77 female). Subjects performed a memory-guided saccade (MGS) task while we obtained EEG data using a 64-channel electrode cap. A preprocessing pipeline to remove noise and optimize the EEG data was utilized. Frequency band spectral events were detected in the gamma (30-70 Hz), beta (15-30 Hz), theta (4-7 Hz) and alpha (8-12 Hz) bands. The average duration, number, and power of these events was computed during the delay (working memory maintenance) epoch. Linear models and age interactions were applied to each EEG and behavioral measure to determine associations with age.

Results: Significant age-related change was observed for spectral events in the gamma, beta, and alpha bands using whole brain measures. We found decreases in all gamma band measures and beta band power through adolescence. In contrast, alpha band measures were found to increase with age. We also observed significant decreases in alpha band power in the occipital lobe and a significant performance by alpha power interaction with age. Similarly, alpha event duration significantly decreased across age in the occipital lobe and a trending decrease in the parietal lobe, both of which had significant performance by alpha interactions with age.

Conclusion: These results suggest that have a higher alpha power in the occipital lobes, a higher alpha event duration in the occipital lobe, and/or a higher alpha event duration in the parietal lobe is detrimental to performance.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Jackson Mitzner

Current Position: Medical Student

Presenter's Email Address: jrm185@pitt.edu

Title: Burned out students report similar utilization rates, lower perceived efficacy of wellness resources

Author(s): Mitzner J, Chou S, Glance J

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Burnout is endemic in medical education, with estimated prevalence ranging from 45-55%, with consequences including increased student attrition and suicidal ideation. Recognizing these problems, the LCME requires medical schools to have established student wellness programs, but it remains unclear how students with burnout perceive the efficacy of these resources when compared to their non-burned out peers.

Methods: Campus wide emails addressed to 1,730 medical students were sent to three institutions, which provided background regarding the study and a link to an anonymous online survey. Interested students completed the 12-item questionnaire, which included demographic information, a single-item burnout survey, and Likert-scale questions on 14 wellness resources. Data were analyzed via SPSS. Descriptive statistics were generated for demographic information. One-way ANOVA and t-tests were used to compare responses between student groups. $P < 0.05$ was considered significant.

Results: 495 students responded. Of those, 328 completed the survey sufficiently for analysis. The overall rate of burnout in the population was 32%. There was no difference in burnout rates by institution, year, or sex. Burnout was more prevalent amongst students with current mental health diagnoses ($p < 0.001$) and students with history of seeking mental health services ($p < 0.001$). There was no difference in the rate of resource utilization between burned out and non-burned out students ($p = 0.975$). Non-burned out students were significantly more likely to rate the resources they had used as effective compared to burned out students ($p = 0.002$) and their mean ranking of resource effectiveness was also significantly higher ($p = 0.001$).

Conclusion: Students suffering from burnout have similar rates of resource utilization, but they perceive those resources as less effective compared to their non-burned out peers. Further study is needed to determine if this more negative perception predates the onset of burnout or if students develop them after trying resources without alleviation of their burnout.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

POSTER WITHDRAWN BY PRESENTER

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Lars H. Nelson, PhD

Current Position: Postdoctoral Scholar

Presenter's Email Address: nelsonl3@upmc.edu

Title: Striatal dysfunction in the Fmr1 knockout mouse

Author(s): Lars N, Lan C, Rui P

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Fragile X Syndrome is monogenic disorder caused by a decrease in Fmr1 gene and FMR1 protein expression. Loss of function of Fmr1 causes hyperactivity, motor coordination problems, anxiety and sensory over-reactivity throughout life. These behaviors are strongly regulated by the striatal network however, there is very little research investigating changes in striatal cell connectivity and function due to loss of Fmr1. Studies in humans with Fragile X Syndrome have found decreased corticostriatal connectivity suggesting that striatal neurons may have decreased synaptic input.

Methods: Structural and functional characteristics of medium spiny neurons (MSNs) in the dorsal striatum were measured using patch clamp electrophysiology in Fmr1 ^{-/-} (knockout) and Fmr1 ^{+/-} (wildtype) adult male mice. The frequency of mEPSCs, a measure of synaptic input, and active cell properties such as firing frequency, rheobase, and firing rate were measured in MSNs. Additionally, we assessed whether there are differences in direct pathway, dopamine receptor 1 (D1R) positive, and indirect pathway, D1R negative, MSNs since these distinct pathways work together to regulate striatal function.

Results: There was increased mEPSC frequency in the Fmr1 ^{-/-} MSNs suggesting that loss of Fmr1 increased the number of synaptic connections onto MSNs. Preliminary analysis found that when MSNs were divided into D1R positive and negative cells, we found that D1R positive, but not negative cells, had an increased mEPSC frequency. We are currently assessing active cell properties such as rheobase and firing rate to determine if MSN function is altered due to loss of Fmr1.

Conclusion: Loss of Fmr1 increased synaptic input onto D1R MSNs suggesting a role for the direct pathway MSNs in Fragile X Syndrome. Future studies assessing active cell properties will help determine whether changes in MSN connectivity are compensating for changes in active cell properties.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Research and Clinical Resources Poster Abstract**

Presenter: Christina Nicassio, MS, MBA

Current Position: Research Program Administrator

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Resource(s): Sleep and Behavioral Neuroscience Center

Description: The SBNC is a 7,000 square ft. state-of-the art clinical research center where sleep and other physiological studies are conducted. The SBNC is part of the Department of Psychiatry at the University of Pittsburgh and is located on the 13th floor of UPMC Western Psychiatric Hospital which is linked both physically (by a tunnel) and organizationally to Presbyterian University Hospital and Montefiore University Hospital.

The facility is divided into six spacious bedrooms and two time-isolation apartments. Each room includes its own bathroom, audio/visual monitoring capabilities, TV, and personal computer. All rooms are equipped to monitor EEG sleep, EKG, respiration, oxyhemoglobin saturation, periodic limb movements, heart rate and heart rate variability (HRV), core body temperature, skin temperature, and mood and performance.

Additional space includes two technical/control rooms, two physiological testing areas, an exam room, subject preparation area, storage, and three lounge areas. Three of the bedrooms are equipped with ports which allow for IV administration of medications and blood sampling during sleep or wake studies. This laboratory also has the capability to perform studies requiring radionuclide injection for positron emission tomography (PET). In addition, the SBNC houses a testing suite for Transcranial Magnetic Stimulation (TMS); we recommend speaking with Fabio Ferrarelli, MD, PhD for further details.

The SBNC is equipped to study individuals across the lifespan including adolescents, young, middle age, and older adults. Our poster will include details about the lab and available resources

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Amar Ojha, BA

Current Position: Graduate Student Researcher

Presenter's Email Address: amo80@pitt.edu

Title: Puberty-related maturation of adolescent frontostriatal resting-state functional connectivity

Author(s): Ojha A^{1,2}, Parr A³, Foran W³, Calabro F^{2,3,4}, Ladouceur C^{1,2,3,5}, Luna B^{1,2,3,5}

Affiliation(s): ¹Center for Neuroscience, University of Pittsburgh; ²Center for the Neural Basis of Cognition, University of Pittsburgh; ³Department of Psychiatry, University of Pittsburgh School of Medicine; ⁴Department of Bioengineering, University of Pittsburgh; ⁵Department of Psychology, University of Pittsburgh

Introduction: Sensation-seeking and reward sensitivity peak during adolescence and are supported by well-characterized changes in frontostriatal connectivity. However, the mechanistic contribution of pubertal maturation to the development of this circuitry remains unclear. Puberty is a core mechanism determining adolescence, when major psychopathology often emerges, and initial findings suggest that pubertal maturation may explain psychopathological risk over and above age. Despite evidence linking striatal activity to age and puberty, it remains unclear which aspect of striatal functioning is driven by puberty beyond age. We hypothesize that changes in frontostriatal resting-state functional connectivity (rsFC), which have been widely implicated across psychopathologies, will be supported by puberty above age and may explain sex differences that emerge during adolescence in disorders such as anxiety and depression.

Methods: We leveraged two datasets of 191 adolescents (101 girls, 386 total scans, ages 8 -19.5) imaged on 3T MRI scanners with a self-report puberty measure. We characterized rsFC between the nucleus accumbens (NAcc) and six prefrontal regions implicated in goal-directed decision-making: anterior ventromedial PFC (vmPFC), subgenual cingulate (sgC), ventral/rostral anterior cingulate cortex (v/rACC), and dorso/ventrolateral PFC (d/vlPFC). We used generalized additive mixed models (GAMMs) to characterize non-linear puberty-related effects associated with rsFC changes while controlling for age separately in girls and boys.

Results: In girls, pubertal maturation was associated with rsFC between the NAcc and anterior vmPFC (Bonferroni corrected, $p=.02$), rACC ($p=.02$), vACC ($p=.04$), and dlPFC ($p<.001$). In boys, puberty was associated with rsFC between the NAcc and rACC ($p<.001$) and vACC ($p=.005$).

Conclusion: These results suggest pubertal maturation plays a dissociable role from chronological age in adolescent frontostriatal rsFC development across both sexes, while girls show more extensive changes across prefrontal cortex. Changes in frontostriatal rsFC driven by puberty may reflect a period of significant maturation of this system that may underlie risk for psychopathology.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Benjamin Panny, BS

Current Position: Research Project Coordinator

Presenter's Email Address: pannyb@upmc.edu

Title: Altered neural substrates of negative reinforcement in OCD patients

Author(s): Panny B, Price R, Wears A, Ahmari S

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Compulsive behaviors in Obsessive-Compulsive Disorder (OCD) are posited to be negatively reinforced via short-term negation of distress-inducing triggers. Human neuroimaging studies suggest that OCD symptoms are related to cortico-basal ganglia circuits, but neural substrates of negative reinforcement in the context of OCD remain poorly understood.

Methods: We recruited 21 OCD patients and 19 healthy controls and used functional magnetic resonance imaging (fMRI) to test the effect of a negative reinforcement behavioral paradigm on a priori regions of interest (ROIs), including the medial orbitofrontal cortex (OFC), nucleus accumbens (NAcc), amygdala, and ventral tegmental area (VTA). Three image types (Compulsion-Related, Negative, Neutral) were displayed in the scanner for 10s, and could then be removed from the screen if participants pressed a button when a signal was given, creating two epochs for analysis (image presentation, image removal).

Results: For compulsion-related images specifically, OCD patients showed a larger increase in medial OFC (BA11) activation in response to image removal. Patients also showed altered patterns of deactivation following compulsion-related and negative image removal in the right and left amygdala, respectively. Patients showed more generalized alterations in response to removal of all image types (specifically, larger deactivations) in the ventral tegmental area, and increased overall activation to negative images in the right nucleus accumbens.

Conclusion: Results provide preliminary data on the altered neural substrates of negative reinforcement in OCD patients, consistent with dominant behavioral models which emphasize the role of negative reinforcement in the etiology and maintenance of pathological compulsive behaviors

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Ashley C. Parr, PhD

Current Position: Postdoctoral Scholar

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Title: Tissue iron, an indirect marker of basal ganglia dopamine, is associated with delinquency and related personality characteristics in late childhood: Initial findings from the ABCD-Social Development Study

Author(s): Parr, AC^{1,2}, Calabro, F^{1,2,3}, Foran, W¹, Fitzgerald, D¹, Klingensmith, K¹, Clark, D¹, Ahonen, L¹, & Luna, B^{1,2}

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Center for the Neural Basis of Cognition, University of Pittsburgh; ³Department of Bioengineering, University of Pittsburgh

Introduction: Little is known about the relationship between neurodevelopment and delinquency. In adolescence, asynchronous maturation of dopamine (DA) reward- and cognitive-systems contribute to a peak in risk- and sensation-seeking behaviors. We have recently shown that striatal tissue iron, reflecting DA availability, contributes to the maturation of frontostriatal circuitry in adolescence, supporting normative decreases in risk-taking into adulthood. We now leverage this template to understand the role of DA in the emergence and persistence of delinquency behaviors (i.e., adolescent-specific vs life-course persistent).

Methods: The novel ABCD Social Development study (ABCD-SD) combines longitudinal neuroimaging with assessments of delinquency and victimization experiences, in addition to personality (e.g., fearlessness) and emotion regulation in 2,700 children (age 9-10 at visit 1). We obtained indices of basal ganglia tissue iron (time averaged and normalized T2* weighted images (nT2*w)) in an initial 586 ABCD-SD participants (285 F, age 9-11, visit 1).

Results: Relative to females, males endorsed more delinquency ($d=-.55, p<.001$), victimization ($d=-.22, p<.01$), aggression ($d=-.46, p<.001$), psychopathy ($d=-.55, p<.001$), and fearlessness ($d=-.51, p<.001$). In males, lower tissue iron was associated with increased delinquency ($\beta=-.11, p<.05$), psychopathy ($\beta=-.15, p<.01$), and fearlessness ($\beta=-.26, p<.001$). In females, higher tissue iron was associated with increased victimization ($\beta=.11, p<.05$), aggression ($\beta=.10, p<.05$), and emotion dysregulation ($\beta=.15, p<.01$). Thus variability in DA function in late childhood may confer risk for delinquency.

Conclusion: This study takes a critical first step towards characterizing predisposing neurobiological vulnerabilities for delinquency. Predictive models applied at future timepoints will identify patterns among these vulnerabilities and deviations from normative development that differentiate phenotypes of high-risk behaviors and their persistence into adulthood.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Research and Clinical Resources Poster Abstract**

Presenter: Sarah L Pedersen, PhD

Current Position: Associate Professor of Psychiatry and Psychology

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Resource(s): Research Equity and Community Health (REACH) Collaborative

Description: The mission of the Research Equity and Community Health (REACH) Collaborative is to conduct highly impactful research that reduces and eliminates inequities for marginalized populations. We are also committed to supporting researchers in 1) reducing biases in scientific language and approach; 2) building trust and engagement with community stakeholders; 3) improving equity and inclusivity in research labs. REACH's website provides resources for researchers to assist in accurate and affirming assessment of sociodemographic characteristics (e.g., gender identity), health equity research funding announcements, Pitt resources for conducting community engaged research, and readings to further knowledge on topics of equity in research. Our website also provides information on current health equity studies and researchers with related expertise and interests. REACH is also invested in growing future scientists committed to health equity research. We maintain a listserv that shares training opportunities as well as announcements for new research initiatives and are developing a health equity research seminar. We welcome questions, feedback, and recommendations that further our department's collective growth in understanding biases in research and determinants of health inequities.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Maria Perica

Current Position: Graduate Student

Presenter's Email Address: mip86@pitt.edu

Title: Age-related changes in glutamate and GABA support excitatory/inhibitory balance during adolescence

Author(s): Perica M¹, Calabro F¹, Foran W¹, Yushmanov V³, Hetherington H³, Larsen B², Tervo-Clemmens B⁴, Luna B¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²University of Pennsylvania; ³Department of Radiology, University of Pittsburgh; ⁴Harvard University

Introduction: Previous animal and postmortem animal and human studies have provided evidence for changes in Gamma aminobutyric acid (GABA) and glutamate during adolescence. In particular, prefrontal increases in inhibitory processes consistent with critical period mechanisms have been found, suggesting that adolescence might be a critical period for the development of higher-order functions, such as cognition. However, limited work has been done in vivo in humans looking at GABA and glutamate directly.

Methods: In this study, we used 7 Tesla Magnetic Resonance Spectroscopic Imaging (MRSI) to investigate age-related changes in GABA, glutamate, their ratio, and their balance across multiple cognitively-relevant regions of prefrontal cortex (n = 144 10 to 30-year-olds).

Results: We found significant age-related decreases in glutamate in the DLPFC ($\beta = 0.15$, $p = 0.016$), ACC ($\beta = 0.21$, $p = 0.0056$), and AI ($\beta = .29$, $p = 6.5 \times 10^{-9}$), with no change in the MPFC. Further, we observed significant age-related decreases in GABA in the AI ($\beta = 0.20$, $p = 9.04 \times 10^{-5}$) and the ACC ($\beta = 0.26$, $p = 3.79 \times 10^{-4}$), and no change in the MPFC or DLPFC ($p = \text{n.s.}$). We then looked at how the ratio of glutamate/GABA was associated with age, and found age-related increases in the ratio of glutamate/GABA in the ACC only ($\beta = -0.15$, $p = 0.044$), and no change in other regions ($p = \text{n.s.}$). Finally, we found age-related increases in glutamate and GABA correlations reflective of improvements in their balance in the right AI ($\beta = -0.20$, $p = 0.042$), ACC ($\beta = -0.22$, $p = 0.0102$), MPFC ($\beta = -0.19$, $p = 0.037$), and a trend-level interaction in the right DLPFC ($\beta = -0.21$, $p = 0.06$). We found no interaction in LDLPFC ($\beta = -0.08$, $p = 1.00$) and LAI ($\beta = -0.11$, $p = 1.00$).

Conclusion: In this study, we found evidence for global decreases in glutamate across most of PFC, with more regionally-specific changes in GABA. Interestingly, we saw that the correlation between glutamate and GABA increased with age, possibly suggesting that there is greater balance between excitation and inhibition in adulthood. Together, these findings provide novel evidence for changes in excitation and inhibition through adolescence that may be acting to enhance balance in a way that is consistent with critical period plasticity.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Brianna Raskin

Current Position: Undergraduate Student Researcher

Presenter's Email Address: brr93@pitt.edu

Title: Investigation of Age- and Sex-Normed Hippocampus and Entorhinal Volumes as Predictors of Subjectively Perceived Decline

Author(s): Raskin B¹, Johnson A^{1,2}, Aizenstein H^{3,4}, Weinstein A³, Mizuno A³

Affiliation(s): ¹Department of Neuroscience, University of Pittsburgh; ²Department of Psychology, University of Pittsburgh; ³Department of Psychiatry, University of Pittsburgh School of Medicine; ⁴Department of Bioengineering, University of Pittsburgh

Introduction: Subjectively perceived cognitive decline may be the first detectable sign of Alzheimer's Disease (AD), but the neural basis is not well understood. We investigated whether hippocampal and entorhinal volumes were associated with subjective decline for different AD stages. We examined these associations by using both raw and norm volumes to explore the potential clinical usage of normative regional volumes.

Methods: We analyzed the ADNI2 baseline data of four diagnostic groups [cognitively normal (CN), subjective memory complainers, mild cognitive impairment (MCI), AD]. We computed normed scores based on means and standard deviations from CN participants' hippocampus and entorhinal volume for two age (cutoff = 75) and two sex groups. We had two outcome measures (Everyday Cognition total score for subjective cognitive decline, a memory subdomain score for subjective memory decline). We ran linear regressions to examine associations between normed volume and subjective decline, controlling for intracranial volume (ICV). Separate models with raw volumes accounted for age, sex, and ICV as covariates.

Results: Entorhinal volumes were not associated with subjective cognitive nor memory decline for any of the groups. Smaller raw hippocampal volumes were associated with greater subjectively reported memory decline only in MCI ($t=-6.36$, $p = 0.003$, Bonferroni corrected). With normed volumes, we observed the same association in MCI but with a trend-level significance ($t= -2.25$, $p=0.09$). With raw volumes, older participants in the MCI group showed greater subjective memory decline ($t=-3.14$, $p=0.006$).

Conclusion: While the entorhinal cortex did not show associations with subjective decline in any groups, smaller raw hippocampal volume was associated with greater subjective memory decline in MCI. This indicates that normed brain volume did not have obvious advantages when used to predict subjective decline. Our observation that subjective memory decline was accounted for by age may guide our use of norm-referenced regional volumes to understand the risk of cognitive decline.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Elena Cannova

Current Position: Research Associate

Presenter's Email Address: cannovaem@upmc.edu

Title: Neighborhood collective efficacy indirectly influences girls' anger regulation through parent factors

Author(s): Cannova E¹, Tung I¹, Hipwell A¹ and Keenan K²

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine;

²Department of Psychiatry and Behavioral Neuroscience, University of Chicago School of Medicine

Introduction: Research on anger development has focused on the parenting context, demonstrating that high levels of perceived stress can increase parents' vulnerability to harsh parenting behaviors, which in turn, increase children's difficulties with anger regulation through coercive cycles of parent-child interactions. Given that difficulties with anger regulation are prospectively associated with problems across the lifespan, it is vital to identify factors that may attenuate the association between parent stress and children's anger regulation. Neighborhood-level protective factors may serve as important stress-reducing resources for families and as such may be leveraged in developing preventive interventions. In this prospective study, we hypothesized that maternal perception of neighborhood collective efficacy (NCE; e.g., perceived cohesion and trust) would influence adolescent girls' anger regulation, via reduced maternal stress and subsequent harsh parenting practices.

Methods: Participants included 213 girls (65% Black; 29% White, 1% Asian, 5% multiracial) oversampled from under-resourced urban neighborhoods. NCE was collected via maternal reports when girls were 9-10 years. Mothers reported on perceived stress and harsh parenting practices when the girl was 11 and 12 respectively. At 13, girls reported on their use of adaptive anger regulation strategies via the Children's Anger Management Scale.

Results: Adjusting for neighborhood crime exposure and age 9 anger regulation in a sequential mediation model, NCE did not directly predict anger regulation ($B=-.03, p>.05$), but was indirectly associated with anger regulation sequentially through maternal stress and harsh parenting ($B=.00, SE=.00, 95\% CI=[.0005, .0095]$). Specifically, NCE predicted lower levels of maternal stress ($B=-.26, p<.001$), which in turn predicted reduced harsh parenting ($B=.06, p<.05$), and ultimately greater child anger regulation skills ($B=-.26, p<.001$).

Conclusion: Findings suggest that NCE plays an indirect role in adolescent girls' anger regulation via family context, providing a potential target for supporting maternal and child health.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Manivel Rengasamy, MD

Current Position: Postdoctoral Scholar

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Title: Connections Between Inflammatory Markers, Neural Reward Circuitry, and Childhood Trauma in Depression

Author(s): Rengasamy M¹, Brundin L^{2,3}, Griffo A¹, Panny B¹, Capan C², Forton C², Price R^{1,4}

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Center for Neurodegenerative Science, Van Andel Institute; ³Division of Psychiatry & Behavioral Medicine, Michigan State University, College of Human Medicine; ⁴Department of Psychology, University of Pittsburgh

Introduction: Depressive disorders are linked to dysfunction in reward-related behaviors and corticostriatal reward circuitry. Low-grade dysregulation of the immune system, e.g., elevations in plasma interleukin-6 (IL-6) and tumor necrosis factor alpha (TNF α), have been thought to affect corticostriatal reward circuitry. Little is presently known about the degree to which these relationships generalize to patients with treatment-resistant depression (TRD) and/or childhood trauma history.

Methods: Resting state functional connectivity between ventral striatum and ventromedial prefrontal cortex regions (VS-vmPFC) and plasma inflammatory marker levels (IL-6, TNF α) were measured in 74 TRD adults. Regression analyses examined associations of inflammatory markers with VS-vmPFC connectivity and the moderating effects of self-reported childhood trauma on these associations, with exploratory analyses examining trauma subtypes.

Results: IL-6 was negatively associated with VS-vmPFC connectivity (specifically for the left VS). Childhood trauma moderated the relationships between TNF α and VS-vmPFC connectivity (specifically for right VS) such that greater childhood trauma severity (particularly emotional neglect) was associated with stronger cytokine-connectivity associations.

Conclusion: This study independently extends previously reported associations between IL-6 and reductions in corticostriatal connectivity to a high-priority clinical population of treatment-seeking TRD patients, and further suggests that childhood trauma moderates specific associations between cytokines and corticostriatal connectivity. These findings suggest that associations between elevated plasma cytokine levels and reduced corticostriatal connectivity are a potential pathophysiological mechanism generalizable to patients with TRD and that such associations may be affected by trauma severity.

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenter: Sarah Riston, MA

Current Position: Sr Research Associate

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Resource(s): Assessing and Facilitating Interventions for Acute Risk for Suicide in a Remote Research Setting

Description: The COVID-19 pandemic and restrictions on social gatherings has increased isolation and psychiatric symptoms in adolescent and adult populations (Melhem et al, 2020). Due to the restrictions over the past 14 months, clinical research has adapted to remote procedures such as Zoom or phone calls, while attending to research participants who may report worsening psychiatric symptoms and suicidality. This change in setting from in person to virtual visits led some to question if research teams could effectively facilitate emergency psychiatric services for research participants in crisis.

The clinical research team in the Neurobiology for Stress Response and Suicide (NEURO-Stress, PI: Nadine Melhem) laboratory has developed an effective protocol to assess clinically significant psychiatric symptoms and suicidality in this remote setting. The clinical research staff assess acute risk for suicide with the Columbia Suicidality Severity Rating Scale (CSSRS; Posner et al, 2009) and obtain the participant's physical location at the time of the zoom or virtual visit. The clinical research team (i.e., research staff, psychiatrist, and PI) receive email and text alerts in real time for current suicidal ideation, method, intent, plan, and recent suicide attempts from the CSSRS and access to firearms questions from the interview. Participants also complete self-report measures that assess current symptoms of depression, anxiety, hopelessness, substance use, history of childhood abuse, and other clinical symptoms. Scores above threshold on these instruments also trigger email and text alerts. Responses to the CSSRS informs the clinical research staff on the need to facilitate remote emergency services or implement other interventions. Based on the risk profile, the interviewer contacts the designated psychiatrist on-call to consult on necessary interventions. Interventions include developing a safety plan, calling the participant's current treatment team, providing referrals for treatment, and calling Resolve with the participant.

The clinical research staff in the NEURO-Stress lab has effectively facilitated emergency services remotely for several research participants who were acutely suicidal over the past 14 months. The CSSRS, other self-report measures, trained clinical research staff, use of technology for real-time alerts, and collaboration with a psychiatrist have served as a good safety net for research participants who are at increased risk for suicidal thoughts and behaviors.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Rebecca Rohac, BS

Current Position: Research Specialist

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Title: Effects of Intravenous Ketamine on Explicit and Implicit Measures of Depression in Hospitalized Suicide Attempters

Author(s): Rohac R, Shivaneekar S, Spotts C, Price RB

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Prior research has shown that intravenous ketamine can effectively reduce suicidal thoughts in depressed participants. However, the utility of ketamine for treating high-risk patients in crisis (i.e. those who have just made a suicide attempt) in real-world contexts (i.e., medically hospitalized inpatients) remains virtually untested. Evidence indicates ketamine's success in reducing suicidal thoughts is due in part to its acute effects on implicit suicidal cognition. The Implicit Association Test (IAT), a performance-based measure of association between concepts, can be used to assess changes in implicit suicidal and depressive cognition as a potential neurocognitive correlate of rapid symptom improvements.

Methods: Subjects included 16 transdiagnostic recent suicide attempters, 18-65 years old who received a single dose of intravenous ketamine (0.5 mg/kg) during the acute post-attempt period of medical stabilization in the acute medical setting. Research Specialists administered the IAT and a self-report measure of self-esteem and trained clinical interviewers rated participants using the Montgomery-Asberg Depression Rating Scale (MADRS) and the Columbia-Suicide Severity Rating Scale (C-SSRS) at 2 repeated sessions: pre-infusion baseline and 24-hours post-infusion. IAT "D" scores were calculated, with larger (positive) scores indicating stronger negative (suicide- and/or depression-related) self-associations.

Results: There were large, rapid decreases in overall depression (MADRS) and CSSRS-worst ideation scores from pre- to post-ketamine ($p's < .001$; Cohen's $d \geq 2.0$). Although IAT D-scores did not significantly change across the entire sample from pre- to post-ketamine ($p's > .15$), the degree to which implicit associations rapidly grew between oneself and positive concepts (worthy, good) was correlated with overall depression symptom improvement ($r = .62; p = .04$) and, at a trend level, with improvements in self-esteem ($r = .56; p = .095$).

Conclusion: Intravenous ketamine is associated with correlated decreases in explicit and implicit measures of suicidal and depressive cognition among recent suicide attempters. Ketamine infusions appear feasible and potentially clinically useful when delivered in the medical inpatient setting, concurrently with usual care.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Ashlyn Runk

Current Position: Research Coordinator

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Title: Cognitive Correlates of Everyday Functioning in a Sample of Predominantly Low-Income, Community Dwelling, African-American Older Adults

Author(s): Runk A¹, Butters M¹, Rosso A², Dubowitz T³, Troxel W³, Gary-Webb T², Haas A³, Ghosh-Dastidar B³, Weinstein A¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Epidemiology, University of Pittsburgh, Graduate School of Public Health; ³RAND Corporation

Introduction: Neuropsychological performance is used to predict functional ability in the context of neurodegenerative disease; however, previous work centers highly educated, predominantly White samples, with little understanding of cognition and everyday functioning in other populations. We examined cognitive correlates of functioning in a sample of mid-late life, mostly African-American, adults.

Methods: Participants (N=253) age 50+ years were recruited from a larger Pittsburgh community cohort study. Cognition was assessed by neuropsychological evaluation. Performance-based measures of functioning included the shopping, medication management, and information retrieval subtests of the Performance Assessment of Self-care Skills (PASS). Self-reported decline was assessed via the Everyday Cognition (ECog) questionnaire. Participants were categorized as not cognitively impaired (NCI) and cognitively impaired (CI) via mean-split of Modified Mini-Mental State Test scores (mean=86). Hierarchical linear regression used cognitive domains as predictors for each functional outcome, adjusting for literacy and neighborhood.

Results: Eight participants were excluded due to invalid data. Compared to the NCI group (N = 169), the CI group (N = 76) was older (68 vs. 65 years), less educated (11 vs. 12 years), performed worse cognitively (p 's $<.001$), had lower literacy ($p<.001$), and performed worse on all PASS measures (p 's $<.04$). Both groups reported clinically elevated ECog scores (1.46 vs. 1.53). In the NCI group, worse executive function was associated with worse PASS shopping ($\beta = -.22$, $p = .01$). In the CI group, worse attention ($\beta = -.37$, $p = .002$) and worse visuospatial ability ($\beta = -.25$, $t = p = .04$) were associated with worse PASS information retrieval. Cognition was not associated with ECog scores.

Conclusion: Executive function, attention, and visuospatial ability, but not subjective cognitive decline, were associated with select PASS subtest performance, suggesting performance-based functional measures may be more sensitive to cognition than self-report measures in predominantly African-American, urban communities. However, this association may vary by performance measurement.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Elisabeth Salisbury, PhD

Current Position: Research Associate Professor

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Title: Physiologic indices of withdrawal in opioid-exposed newborn

Author(s): Bloch-Salisbury E^{1,2}, Rodriguez N², McKenna L², Goldschmidt L³

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Pediatrics, University of Massachusetts Medical School; ³Department of Epidemiology, University of Pittsburgh School of Medicine

Introduction: Newborns exposed to opioids during pregnancy commonly experience pathophysiologic instability of the central and autonomic nervous systems that manifests in a range of withdrawal symptoms. Despite widespread use of pharmacotherapy to manage neonatal drug withdrawal, the underlying physiology of withdrawal in newborns is not well defined. Objective, continuous physiologic measures over prolonged intervals of time that help quantify dysregulation are needed to better assess and optimize individualized treatment, including first-line strategies (e.g., swaddling, skin-to-skin, breastfeeding) and pharmacological agents.

Methods: This study examined physiologic markers for quantifying withdrawal in hospitalized opioid-exposed full-term newborns. Cardiac and respiratory activity were measured continuously throughout interfeed intervals in a single 8-10 hour session to provide an index of withdrawal. Infants were randomly studied at different time-points of treatment to obtain a general understanding of physiologic changes that may occur throughout the course of withdrawal among hospitalized infants.

Results: Seventeen infants (12 male) were studied between day 4 and 29 of life. Sixteen infants were treated with morphine: 14 were studied while managed with morphine and two after weaned. One infant had no pharmacotherapy throughout hospitalization. On average mean heart rate (137 beats/min, SD 7) fell within normal newborn range, whereas mean respiratory rate (73 breath/min, SD 13) exceeded normative values. Higher mean respiratory rates were associated with infants studied at earlier day of life ($\rho=-0.624$, $p=0.007$) and earlier in their total course of morphine treatment ($\rho=-0.676$, $p=0.004$). Tachypneic episodes (abnormally fast breathing) were less common as babies advanced in age ($\rho=-0.528$, $p=0.029$) and with more days in treatment ($\rho=-0.504$, $p=0.047$).

Conclusion: In this preliminary study we demonstrated that continuous physiologic measures can provide objective markers of withdrawal in opioid-exposed newborns. Measures that distinguish between typical and atypical/dysregulated function, e.g., respiratory rates, are critically important for determining course of treatment to promote healthy developmental outcomes.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: M. McLean Sammon

Current Position: Research Specialist

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Title: Associations among negative social media experiences, depressive symptoms, and SITBs in young adults

Author(s): Sammon MM¹, Brent D¹, Silk J², Nesi J³, Choukas-Bradley S⁴, Vogt K¹, Oppenheimer C¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Psychology, University of Pittsburgh; ³Brown University; ⁴University of Delaware

Introduction: There has been an alarming rise in depressive symptoms (DEPsx) and suicide in young adults over the past decade; thus, it is important to identify risk factors for self-injurious thoughts and behaviors (SITBs) in early adulthood, when the risk for first suicide attempt peaks. The rise in SITBs parallels a rise in social media (SM) use in young adults. The role of SM in psychopathology has recently received substantial research attention. So far, evidence suggests that time spent on SM is not strongly related to DEPsx or SITBs; however, specific aspects of SM may be detrimental to young adults. For example, emerging research suggests that cybervictimization is associated with SITBs and DEPsx, but very little is known about how more common negative experiences on SM (e.g., receiving fewer likes) are related to SITBs. The current investigation examines how a new measure of SM experiences relates to SITBs and DEPsx.

Methods: 21 young adults with recent SI alone, or recent SI and NSSI (SITB group), and 13 healthy controls (HC) with no history of SITBs or psychopathology, completed measures of DEPsx and SM experiences.

Results: A logistic regression illustrated that there was a significant association between negative SM experiences and SITBs ($B = 1.45$, $SE=0.60$, $Wald=5.87$, $p = 0.02$), where having more negative SM experiences was associated with the presence of SITBs. Negative SM experiences were also significantly correlated with DEPsx. After controlling for DEPsx, the association between negative SM experiences and SITBs was no longer significant.

Conclusion: Results suggest that common negative SM experiences are related to DEPsx in young adults. Future longitudinal research with larger samples is needed to examine the extent to which negative SM experiences are associated with SITBs. One possibility is that negative SM experiences influence SITBs over time through the mediating role of DEPsx.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Skye A. Satz, BS

Current Position: Research Specialist

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Title: Differential resting-state network connectivity is associated with memory consolidation processes in individuals with depressive disorders

Author(s): Satz S¹, Halchenko YO², Ragozzino R¹, Lucero MM¹, Phillips ML¹, Swartz HA¹, Manelis A¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine;

²Department of Psychological and Brain Sciences, Dartmouth College

Introduction: Resting state functional connectivity is affected by experiences, including memory acquisition, preceding the resting state scan. Previous research indicated that individuals with depressive disorders (DD) have aberrant resting state connectivity and may experience memory dysfunction. However, little is known about how memory strength is related to functional connectivity within and between resting state networks in these individuals during follow-up rest.

Methods: 52 individuals with DD (age=28.2±0.9, 42 female) and 45 healthy controls (HC, age=29.0±1.0, 33 female) completed clinical interviews, and a food and object encoding task followed by a forced-choice recognition test and a 5-min resting state fMRI scan, administered immediately after the forced-choice task. Resting state networks identified using Independent Component Analysis (ICA) across all 97 participants were cross-correlated with the 7-network solution from Yeo (2011) using fsfMRI. Using network modelling with dual regression and FSLNets, we tested how diagnostic status moderated the relationship between memory accuracy and connectivity measures within and between resting state networks.

Results: Network modelling revealed that the correlation between the default mode network (DMN) comprised of the medial prefrontal cortex, posterior cingulate cortex and hippocampal formation, and functional connectivity in the dorsal attention network (DAN) comprised of the inferior temporal, parietal, and prefrontal cortices, was significantly associated with the interaction between recognition accuracy and diagnostic status ($p=0.02$). Specifically, a stronger positive correlation between these two networks was observed in individuals with DD who showed higher memory accuracy prior to resting state. No such effect was observed for HC.

Conclusion: The DMN and DAN typically anticorrelate. Our findings that individuals with DD, but not HC, showed stronger positive correlation between these two networks in the context of accurate memory performance preceding resting state, suggests aberrant post-task memory consolidation processes, which may lead to continuous “replay” of previously learned information and underlie rumination in depression.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Kirsten E. Schoonover, PhD

Current Position: Postdoctoral Associate

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Title: Actin Regulation and Energy Production in Layer 3 Prefrontal Cortex in Schizophrenia

Author(s): Schoonover K¹, Fish K^{1,2,3}, Lewis D^{1,2,3}

Affiliation(s): ¹Translational Neuroscience Program, Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Neuroscience, Dietrich School of Arts and Sciences, University of Pittsburgh; ³Center for the Neural Basis of Cognition, Carnegie Mellon University

Introduction: Working memory, the ability to transiently maintain and manipulate a limited amount of information to guide thought or behavior, is impaired in schizophrenia. This impairment has been suggested to stem from hypoactive glutamatergic pyramidal neurons in layer 3 (L3PNs) of the dorsolateral prefrontal cortex (DLPFC). In schizophrenia, L3PNs exhibit morphological abnormalities such as smaller somal sizes, shorter dendritic arbors, and fewer dendritic spines, features that are all regulated by actin dynamics. In addition, lower spine density is thought to be accompanied by fewer excitatory inputs and a lower need for energy production.

Methods: We applied multiplex fluorescent *in situ* hybridization to postmortem DLPFC from 20 matched pairs of schizophrenia and unaffected comparison subjects to quantify relative levels of critical molecules in actin dynamics, such as the ARP2/3 complex (directly regulates actin nucleation) and LIMK1 (regulates actin depolymerization), as well as COX411 (a marker of energy production) in total deep layer 3, and separately in deep layer 3 neuropil, vesicular glutamate transporter 1 (VGLUT1+) cells and VGLUT1- cells. Using open-source deep-learning network *Stardist* in conjunction with QuPath, we automated selection of each sample of interest in 20x magnification montages of whole tissue sections.

Results: No differences were observed in total deep layer 3 for any of the dependent measures or for lipofuscin or VGLUT1 mRNA levels. Analysis of the neuropil, VGLUT1+ cells, and VGLUT1- cells is in progress.

Conclusion: Our data replicate previous findings in total layer 3 (Arion et al., 2010) that found no schizophrenia-associated alterations of ARP2/3, LIMK1 or VGLUT mRNA. Our in progress data should help determine if alterations in these transcripts occur in a pyramidal cell-specific fashion as suggested by prior microarray studies of L3PNs.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Maya C. Schumer, BS

Current Position: PhD Student in Neuroscience

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Title: Amygdala, Orbitofrontal, and Medial Prefrontal Activation During Implicit Facial Emotion Processing Distinguish Young Adults With Low and High Levels Of Negative Urgency From Those With Bipolar Disorder

Author(s): Schumer MC¹, Bertocci MA¹, Santos JPL¹, Bonar L¹, Gill MK¹, Abdul-Waalee H¹, Bebko G¹, Stiffler R¹, Lockovich JC¹, Aslam HA¹, Birmaher B¹, Versace A¹, Chase HW¹, Graur S¹, Johnson SL², Phillips ML¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Psychology, University of California, Berkeley

Introduction: Bipolar disorder (BD) is marked by emotion-triggered impulsivity during emotion-regulation in emotion-processing/regulation neural circuitry. Neuroimaging can identify objective markers of BD-risk in this circuitry. One component of BD emotion-triggered impulsivity is negative urgency (NU), impulsively responding to negative affect. We compared transdiagnostic individuals (n=224) to individuals with BD (n=59) during fMRI emotion-processing to distinguish individuals with differing NU-based risk for BD.

Methods: 283 young adults (22.34±2.92 years) were fMRI-scanned while viewing angry, fearful, sad, and happy faces. The UPPS-P Impulsive Behavior Scale assessed NU, median-split into low-NU (n=113) and high-NU (n=111) groups. Face-related activity was examined using anatomical ROIs including striatum, amygdala, orbitofrontal cortex (OFC), ventrolateral and medial prefrontal cortices (VLPFC/MPFC), and anterior cingulate and meta-analytic ROIs from our recent meta-analysis of BD fMRI studies. Parameter estimates were separately extracted. Separate regularized regression analyses for each ROI approach assessed group differences in a multinomial logistic framework including age and sex.

Results: Elastic net regression cross-validation identified 5 neuroimaging and 1 demographic (age) non-zero predictors that optimized model fit. Nagelkerke pseudo *r*-squared indicated that these predictors explained 19.1% of the variance in group; the final model *p*<0.001. The 5 neuroimaging predictor variables were: right amygdala, left lateral OFC to anger, right lateral OFC to fear, left MPFC to sad, and right medial OFC to happy. Post-hoc Tukey HSD-corrected tests individually compared low-NU and high-NU to BD: low-NU and high-NU had significantly lower amygdala and left lateral OFC activity to anger versus BD; high-NU had significantly lower MPFC activity to sadness versus BD; and low-NU and high-NU had significantly greater medial OFC activity to happiness versus BD. Elastic net with meta-analytic ROIs did not yield any non-zero neuroimaging predictors.

Conclusion: These findings suggest that limbic-prefrontal alterations in young adults with low-NU and high-NU may be emotion-triggered impulsivity-based objective BD vulnerability markers.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Madeline R. Scott, PhD

Current Position: Postdoctoral Scholar

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Title: Altered 12 hour rhythms in the dorsolateral prefrontal cortex of subjects with schizophrenia

Author(s): Scott MR¹, Ketchesin KD¹, Zong W², Seney ML¹, Tseng GC², Zhu B³, McClung CA¹

Affiliation(s): ¹Translational Neuroscience Program, Department of Psychiatry, Center for Neuroscience, University of Pittsburgh School of Medicine; ²Department of Bioinformatics, University of Pittsburgh; ³Aging Institute of UPMC, University of Pittsburgh School of Medicine

Introduction Twelve-hour (12h) rhythms are a longstanding phenomenon observed in coastal marine organisms. While 12h cycles are indicated in certain human behavior, no study to date has characterized 12h rhythms in the human brain or in psychiatric illnesses. Previously we demonstrated circadian reprogramming in schizophrenia (SZ) dorsolateral prefrontal cortex (DLPFC). Specifically, mitochondria transcripts have 24 h rhythmic expression in SZ not observed in non-psychiatric subjects (NP). 12h rhythms are enriched for mitochondria-associated transcripts across studies, suggesting they may have a role in this temporal abnormality.

Methods We utilize multiple approaches to investigate 12h rhythms in RNA-sequencing data from the DLPFC in both NP (n = 104) subjects and subjects with SZ (n = 46). The eigenvalue/pencil method assumes gene expression is the result of multiple superimposed oscillations and identifies a combination of rhythmic components that best explains the data without any constraints on the period, amplitude, or phase of the rhythm. In a second analysis, each gene was fit with a sinusoidal curve with a fixed frequency of 12h using a nonlinear least-squares method.

Results Both methods show 12h rhythms in mitochondrial function and protein translation genes that peak in expression at sleep/wake transitions (~9 AM/PM). In contrast, these pathways shift in timing to static periods (~3 PM/AM) in tissue from subjects with SZ. SZ subjects also lose 12h rhythms in genes associated with the unfolded protein response (UPR) and neuronal structural maintenance.

Conclusion We observe 12h rhythms in the human brain in pathways essential for cellular function. Subjects with SZ have fewer 12h rhythms, likely due to lost UPR gene rhythmicity, a pathway implicated in 12h rhythm regulation. Mitochondria and translation pathways have altered timing in SZ, suggesting temporal differences in energy availability in the DLPFC, a brain region associated with the cognitive symptoms in SZ.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Haley Sheehan

Current Position: Research Specialist

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Title: Acute Alcohol Consumption's Effects on Subsequent Same Day Sleep Characteristics: A Multi-Method Examination

Author(s): Sheehan H, Boness C, Wallace M, Graves J, Lindstrom R, Pedersen S, Hasler B

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: A circadian preference for eveningness and acute alcohol consumption are both associated with sleep disturbances. While alcohol consumption tends to reduce sleep onset latency, it also increases awakenings. Greater sleep onset latency related to eveningness may increase likelihood of evening chronotypes using alcohol as a sleep aid. Previous research has not examined the additive effects of circadian preference and acute alcohol consumption on various sleep characteristics. The current study hypothesized that compared to non-drinking and placebo days, naturalistic and laboratory alcohol consumption would result in decreased sleep onset latency, increased wake after sleep onset, and later sleep timing. We also explored the interaction between eveningness and alcohol consumption in predicting sleep onset latency, wake after sleep onset, and sleep timing.

Methods: Fifty young adult weekly binge drinkers (48% female; 18% Asian, 6% Black, 4% Mixed racial background, 72% White, $Mage=22.9$, $SD=2.22$) completed the Composite Scale of Morningness during a baseline interview. During two 11-day protocols, participants reported on their drinking using ecological momentary assessment and completed a within-person alcohol administration. An Actiwatch was used to monitor sleep indices. Age, sex assigned at birth, and race were included as covariates in the analyses.

Results: Mixed-effects models showed that greater eveningness and naturalistic alcohol use each predicted later sleep timing [$t(795) = 4.88$, $p < .001$]. Laboratory alcohol consumption did not significantly predict changes in sleep characteristics. Greater eveningness was associated with longer sleep onset latency following placebo and alcohol sessions [$t(30) = 2.74$, $p < .05$]. The interactions between eveningness and naturalistic or laboratory alcohol use on sleep characteristics were not significant.

Conclusion: Although naturalistic drinking was associated with later sleep timing, results did not demonstrate significant effects of laboratory drinking on sleep characteristics. Further research examining additional possible moderators (e.g., timing of drinking) of alcohol's effects on sleep is needed to understand sleep disruption following alcohol use.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Shreya Sheth, MA

Current Position: Research Associate

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Title: Negative Affect as a Predictor of Prospective Suicide Attempts in Borderline Personality Disorder

Author(s): Sheth S, Allen T, Dombrovski A

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Identifying reliable predictors of suicidal behavior in borderline personality disorder (BPD) is complicated by the heterogeneous nature of the disorder. Dimensional models of psychopathology may help to parse this heterogeneity and identify more reliable indicators of risk. The present study uses continuous time survival analysis to examine whether three latent dimensions of psychopathology, Negative Affect, Antagonism, and Disinhibition, predict the occurrence and timing of suicidal behavior in a high-risk longitudinal sample of individuals diagnosed with BPD.

Methods: Participants included 453 adults diagnosed with BPD at the time of enrollment. At semi-annual or annual follow-ups, clinicians administered the Suicide History and Lethality Rating Scale to determine the occurrence and date of any attempts since the last study visit. A battery of self-report and interview measures were administered at baseline to assess Negative Affect, Disinhibition, and Antagonism.

Results: Confirmatory factor analysis indicated that a model consisting of correlated latent factors for Negative Affect, Disinhibition, and Antagonism was a good fit to the data (CFI = .95, RMSEA = .05, SRMR = .06). Only Negative Affect was associated with a greater likelihood of making a prospective suicide attempt (OR = 1.07, $p < .001$). Survival analyses indicated that Negative Affect was associated with a shorter time to the first suicide attempt post-baseline (HR = 1.07, $p < .001$). At the 10-year follow-up, there was a 24% increase in survival probability for individuals high (+1 SD) on Negative Affect relative to those low on Negative Affect (-1 SD).

Conclusion: Negative Affect predicted the likelihood of and time to the next prospective suicide attempt in individuals diagnosed with BPD, whereas externalizing features of the disorder were unrelated to suicidal behavior. Dimensional approaches to psychopathology may help to parse heterogeneity present in BPD, leading to the discovery of more reliable predictors of important clinical outcomes.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Miriam Sheynblyum, BA

Current Position: Research Specialist

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Title: Feasibility Study to Train Speech-Language Pathologists to Work with Autistic Children

Author(s): Sheynblyum M¹, Baumann B¹, Nathan J², Nathan B²

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Nathan Speech Services

Introduction: Speech-language pathologists (SLP) play a critical role in supporting children on the autism spectrum. Despite the increasing number of autism diagnoses, SLPs working with school-age autistic children receive minimal training on working with this population. Effective autism interventions can increase the academic and social outcomes of autistic children who are limited in their problem-solving abilities. Providing therapists with a strong understanding of autism and interventions that generalize to multiple areas of children's lives is essential. In this feasibility study, we developed and administered a training program with the goal of providing foundational information and skills development for SLPs working with school-age autistic children.

Methods: Nine SLPs participated in an 8-hour training program for a cognitive-based autism intervention as part of the Thinking in Speech (TIS) Study. Training consisted of background reading, discussion, analysis of expert TIS sessions, behavioral role play, and practice sessions with individualized feedback from the developer. Therapists completed self-report questionnaires of knowledge and comfort in working with autistic populations and a training evaluation.

Results: Therapists (n=9) reported high levels of satisfaction with the training content (M = 28.6/30) and the trainer (M = 4.8/5). Therapists' levels of comfort with taking responsibility for a child's dysregulation during therapy and taking responsibility for their mistakes during therapy increased from pre- to post-training ($t(4)=-2.138$, $p=.009$). Therapists' level of comfort implementing TIS and interacting with caregivers during sessions (e.g., explaining intervention strategies, explaining the caregivers role in therapy) increased from pre- to post-training, although the change was not significant.

Conclusion: A one-day training may be appropriate to increase SLPs comfort and knowledge relevant to working with autistic children and their caregivers. This lays the foundation for a cost-effective training to improve access for autistic children to knowledgeable and skilled SLPs as the need for such services continues to increase.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Justin H. Skiba

Current Position: Medical Student, University of Pittsburgh School of Medicine

Presenter's Email Address: jhs60@pitt.edu

Title: Expressive Suppression and Anxiety in Children with Parental Cancer

Author(s): Skiba, J¹, Goodfriend, E², Melhem, N²

Affiliation(s): ¹University of Pittsburgh School of Medicine; ²Department of Psychiatry, University of Pittsburgh School of Medicine,

Introduction: There is a well-established association between early life stress events and the development of anxiety symptoms and disorders later in life. The assessment of anxiety symptomatology in children currently experiencing an early stressful life event, however, is relatively understudied. Maladaptive coping strategies, such as the concealment of outward emotional expression known as expressive suppression (ES), may place children experiencing adversity at greater risk for anxiety symptomatology. This study will assess the relationship of ES and anxiety in a cohort of children/adolescents who are undergoing the stressor of having a parent recently diagnosed with cancer.

Methods: The sample consisted of 237 offspring from 155 families, ages 9-24, 81 with a parent recently diagnosed with cancer and 154 control offspring from families with no cancer or severe chronic disease in their parents or siblings. Subjects were given a range of self-reported questionnaires to assess various risk-factors for worse anxiety symptoms and anxiety symptomatology (measured via SCARED questionnaire).

Results: The cancer group reported higher SCARED and ES scores compared to control, reflecting higher anxiety symptomatology, and greater suppression of emotional expression. Additionally, the cancer group was significantly associated with clinically significant SCARED scores (>25) compared to control group. The regression model for anxiety in both groups controlling for sex, lifetime history of anxiety disorder, and social support showed that adding the ES score lowered the effect of the cancer group on anxiety, and is thus has a partial mediation effect. Within the cancer group, the most parsimonious regression model for anxiety symptomatology included ES, child's fear of cancer, lifetime history of anxiety, and sex, all of which besides female sex were associated with greater anxiety symptoms.

Conclusion: ES mediated the relationship between parental cancer and anxiety symptomatology in these children, and it was significantly associated with greater anxiety in both groups.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Alfredo Sklar, MD, PhD

Current Position: Postdoctoral Scholar and Staff Psychiatrist

Presenter's Email Address: sklaral@upmc.edu

Title: Load-Dependent Functional Connectivity Deficits During Visual Working Memory in First-Episode Psychosis

Author(s): Sklar A, Coffman B, Torrence N, Fishel V, Salisbury D

Affiliation(s): Clinical Neurophysiology Research Laboratory, Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Aberrant network connectivity is increasingly viewed as a core dysfunction in psychosis and may underly many of its associated cognitive deficits. Working memory relies upon coordinated activity across distributed brain regions and has consistently exhibited impairments in schizophrenia. Previous work in first-episode (FE) populations suggests a preservation of working memory network function during low-load conditions with disruptions becoming apparent as task complexity increases. The present study assessed visual network connectivity and its contribution to load-dependent working memory impairments.

Methods: Magnetoencephalography was recorded from 35 FE and 27 matched controls (HC) during a lateralized change detection task. Impaired alpha desynchronization was previously identified within bilateral dorsal occipital (Occ) regions during high, but not low-load conditions. Whole-brain functional connectivity was assessed using phase-locking value (PLV) with bilateral Occ identified as connectivity seeds. Connections exhibiting significant PLV load modulation across participants were compared between groups, across conditions.

Results: Across groups, significant load-dependent modulation of functional connectivity was observed between 7 region pairs (FDR-corrected $p < .05$). While HC exhibited significantly larger PLVs during the high-load condition across all (p 's $< .05$), FE failed to exhibit this enhancement between right Occ and left inferior frontal gyrus (IFG), lateral occipito-temporal sulcus, and anterior intermediate parietal sulcus (AIPS) (p 's $> .1$). Smaller PLVs between right Occ and both left IFG ($r = -.51$, $p = .002$) and AIPS ($r = -.48$, $p = .004$) during the high-load condition were associated with increased SAPS Reality Distortion scores in patients.

Conclusion: Examination of functional connectivity across the visual working memory network in FE revealed an inability to enhance communication between perceptual and executive networks in response to increasing cognitive demands compared to HC. Furthermore, the degree of impairment in this communication was associated with reduced positive symptoms. These findings highlight the contribution of network connectivity to cognitive control deficits and symptoms in early psychosis and provide potential targets for future interventions.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Dana Smith, BA

Current Position: Graduate Student

Presenter's Email Address: dms237@pitt.edu

Title: Effects of chemogenetic manipulation of VTA to amygdala projection on cocaine cue associative learning

Author(s): Smith, DM^{1,2}, Torregrossa, MM^{1,2}

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Center for Neuroscience, University of Pittsburgh

Introduction: Environmental cues paired with repeated drug use are a main driver of relapse. Research indicates that the amygdala receives input from thalamic and cortical regions to encode the sensory component of drug-paired cues, but it is unknown which regions are responsible for encoding the reinforcing interoceptive effects of the drug that become associated with the cue.

Methods: Sprague Dawley rats received infusions of virus expressing inhibitory or excitatory DREADD (designer receptors exclusively activated by designer drugs) or a control virus into the ventral tegmental area (VTA). Rats were implanted with cannula over the lateral amygdala (LA) and intravenous catheters. Following surgery, rats were trained to self-administer cocaine paired with an audiovisual cue for 5 days. Before each session, rats received LA microinfusions of the DREADD ligand clozapine-N-oxide (CNO) or vehicle control. CNO activates the inhibitory or excitatory DREADD to silence or excite the VTA to LA projection during the session. After self-administration, animals had their cocaine-seeking behavior extinguished and underwent cue-induced and cocaine-primed reinstatement as tests of relapse-like behavior.

Results: Silencing the VTA to LA projection slowed the acquisition of cocaine self-administration such that animals expressing the inhibitory DREADD that received CNO earned fewer cocaine infusions and made fewer active lever presses relative to all other groups. Inhibition of this projection during training had no effect on reinstatement. While exciting this projection did not affect acquisition, animals expressing the excitatory DREADD that received CNO during training showed greater cue-induced reinstatement than any other group. However, excitation of the VTA to LA projection did not affect cocaine-primed reinstatement.

Conclusion: Silencing the VTA to LA projection during training dampens drug-cue associative learning thus preventing cues from facilitating acquisition of cocaine self-administration. Interestingly, exciting this projection during training may make drug-paired cues more salient as they induce greater relapse-like behavior when presented following abstinence.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Sang Joon Son, MD

Current Position: Visiting Scholar

Presenter's Email Address: sons3@upmc.edu

Title: Accelerated brain aging using an established machine learning model: clinical application for the detection of cognitive function and amyloid status in the elderly

Author(s): Sang JS^{1,3}, Karim H^{1,2}, Aizenstein H^{1,2}, Andreescu C¹, Wu M¹, Mizuno A¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Bioengineering, University of Pittsburgh; ³Department of Psychiatry, Ajou University School of Medicine, Suwon, South Korea

Introduction: Brain age prediction models use machine learning to estimate an individual's chronological age from neuroimaging gray matter volume. These models have been used recently to demonstrate the association between greater brain age with cognitive impairment in the elderly. We aimed to verify the utility of our brain age machine learning model using real-world clinical data that was completely independent of training data and identify associations with cognitive function and amyloid.

Methods: We analyzed brain MRI and clinical data of 650 participants from real-world memory clinics in South Korea. We employed a pretrained brain age model that uses gray matter maps of individuals without amyloid pathology and applied our model to this data as an independent test set. Individual brain age residual was calculated as an index of age-related brain health. We investigated the association between brain age residual and cognitive function and diagnosis by linear, multinomial logistic regression and receiver operating characteristic curve analysis. In addition, survival analysis, using a Cox proportional hazard regression, was conducted in 290 participants who had available follow-up data, to examine the progress of cognitive decline.

Results: We found that our pretrained brain age model was able to reliably estimate brain age (MAE <5 years). Our brain age model was able to discriminate patients with and without dementia [Odds Ratio (95% confidence interval, CI) for dementia = 2.50 (1.80-3.47)]. Area under curve, sensitivity and specificity of the brain age residual for diagnosis of dementia were 0.751, 0.687, 0.719 (age ≤ 70) and 0.791, 0.711, 0.767 (age ≤ 65), respectively. Initial brain age was shown to be useful in predicting future cognitive function worsening even after adjustment APOE e4 and amyloid deposition [Hazard ratio (95% CI) = 3.13 (1.42-6.87)].

Conclusion: These results from a real-world dataset demonstrate that there is potential clinical utility of machine-learning brain age models in monitoring the progress of brain atrophy in AD and AD-related dementias. When considering that MRI is commonly obtained in memory clinics, brain age models may offer benefits in discriminating cognitive impairment and tracking disease progression in the elderly.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

POSTER WITHDRAWN BY PRESENTER

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenter: Amy Byrd, PhD

Current Position: Associate Professor of Psychiatry

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Resource(s): STEADY Study

Description: Secondary analyses of multi-wave data (baseline, 4-months, 8-months, 12-months) from the longitudinal Studies in the Treatment of Emotion and Affect Dysregulation in Youth (STEADY). Two groups of mothers with offspring ages 36-47 months are recruited: (1) mothers with borderline personality disorder (BPD) and (2) mothers without a psychiatric illness since conception of target child. Mothers with BPD are randomized to receive Dialectical Behavior Therapy or services as usual. Data consist of psychophysiological and observational indices collected during parent-child interactions, multi-informant psychopathology symptom count and severity scores (e.g., ADHD, ODD, CD, depression, anxiety, eating disorders, BPD), treatment information, and contextual risk and protective factors.

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenter: Stephanie Stepp, PhD

Current Position: Associate Professor of Psychiatry

Presenter's Email Address: steppsd@upmc.edu

Resource(s): MoodY Study

Description: Secondary analyses of multi-wave data (baseline, 9-months, 18-months) from the longitudinal Emotional and Personality Development in Youth (MoodY) study. Participants were oversampled for high levels of emotional reactivity and include 165 youth (age range=10-14; ~50% female) in psychiatric treatment for any mood or behavior problem, and their primary caregiver. Data consist of psychophysiological and observational indices collected during parent-child interactions, multi-informant psychopathology symptom count and severity scores (e.g., ADHD, ODD, CD, depression, anxiety, eating disorders, BPD) and ecological momentary assessments (EMA) of emotions and behaviors in daily life as well as other contextual risk factors.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Harrison J. Stern

Current Position: Medical Student, MS4

Presenter's Email Address: hjs30@pitt.edu

Title: Objective and Subjective Physical and Mental Health Benefits in Older Adults with Cardiometabolic Risk After a Diabetes Prevention Program-Based Lifestyle Intervention

Author(s): Stern, H.J.¹, Rothenberger S.D.², Miller R.G.³, Levine M.D.⁴, Conlon R.P.K.⁴, Marcus M.D.⁴, Venditti E.M.^{3,4}

Affiliation(s): ¹University of Pittsburgh School of Medicine; ²Division of General Internal Medicine, University of Pittsburgh; ³Department of Epidemiology, University of Pittsburgh Graduate School of Public Health; ⁴Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Physical function (PF), health-related quality of life (HRQOL), and depressive symptoms are each key outcomes for older adults (≥ 65 y) participating in behavioral weight management, but less is known about relationships among these variables with lifestyle intervention.

Methods: We evaluated associations between changes in PF, HRQOL, and depressive symptoms after a 1-year Diabetes Prevention Program (DPP)-based lifestyle intervention. All participants attended 12 in-person weekly group sessions, then were randomized to continued monthly contact by phone or newsletter, losing 7.4% (CI) (-8.9, -5.9) and 6.1% (-8.6, -3.6) of weight at 1 year, respectively. Goals included reducing calorie and fat intake, increasing lean protein, ≥ 150 minutes aerobic activity/week, and strength training. PF was measured by Short Physical Performance Battery (SPPB) gait speed, chair rise, and balance tests, perceived HRQOL by SF-12 Physical & Mental Component Summary (PCS & MCS) scores, and mood by Center for Epidemiologic Studies Depression Scale (CES-D). Associations between baseline to 12 month changes in SPPB, HRQOL and CES-D were estimated in mixed-effect models.

Results: Participants ($N=322$) were $M\pm SD$ age $71.2y\pm 4.3$, BMI 33.8 ± 5.1 , 77% women, 13% Black, averaged 4 chronic conditions, and 31% had prediabetes. Most took blood pressure (67%) and lipid (52%) medications. SPPB improved by 0.3 ± 1.4 ($p=0.001$) in phone and 0.3 ± 1.7 ($p=0.02$) in newsletter. In the phone group, increased SPPB was associated with improved PCS ($\beta=+1.5$, $SE=0.38$, $p<0.001$) and CES-D ($\beta=-0.8$, $SE=0.32$, $p=0.01$). In the newsletter group, increased SPPB was associated with improved PCS ($\beta=+1.6$, $SE=0.30$, $p<0.001$) and reduced MCS ($\beta=-0.6$, $SE=0.29$, $p=0.03$).

Conclusion: After weight loss, regardless of follow-up mode, modestly improved physical function relates to greater perceived physical HRQOL in high cardiometabolic risk older adults and modest improvement in CES-D for the phone contact group only. Future weight management trials should seek how to optimize and maintain PF and subjective well-being outcomes in this population.

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenter: Ashley Stiller

Current Position: Database Administrator

Presenter's Email Address: stillera2@upmc.edu

Resource(s): Pittsburgh Girls Study data

Description: The Pittsburgh Girls Study (PGS) is a landmark study that continues to make major contributions to understanding of girl's and women's health and development.

The PGS is a population-based, longitudinal study of 2,450 girls that began in 1999 with the goal of examining the early antecedents and development of emotional and behavioral problems from childhood to early adulthood. The sample was identified following an enumeration of 103,238 Pittsburgh households to locate girls between the ages of 5 and 8 years (see Hipwell et al 2002; Keenan et al 2010). Of 2,992 eligible families, 85% agreed to participate in a longitudinal study.

The PGS is racially diverse: 52% of the PGS participants are Black, 41% White, and 7% are multiracial or represent another race. At the start of the study, 22% of families lived below the poverty threshold, 33% received public assistance, 17% of parents had completed less than 12 years of education, and 44% of caretakers were single. Nearly all the primary caregivers were biological mothers (92%). The scope of research is broad with special focus on the following topics: Depression, Substance Use, Obesity, Borderline Personality Disorder, Self-injury and Suicidality, Health Disparities, Perinatal Mental Health, Intergenerational effects and Cardiometabolic and Cardiovascular Health.

Over the past 19 years, the PGS participation rate has averaged 89%, with 86% (n=2,107) retention of the original sample in the past year.

Faculty proposals for secondary data analysis are welcomed, and should be submitted to Alison Hipwell, PhD (hipwae@upmc.edu) and Stephanie Stepp, PhD (steppsd@upmc.edu).

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Sierra J. Stringfield, PhD

Current Position: Postdoctoral Associate

Presenter's Email Address: sjs205@pitt.edu

Title: Impact of THC on delay-phase neuronal activity during a working memory task

Author(s): Stringfield, S, Torregrossa, M

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine.

Introduction: The acute and long-term effects of exposure to the primary psychoactive component of cannabis, delta-9-tetrahydrocannabinol (THC), are of interest due to prospective therapeutic uses and the abuse potential of the drug. We sought to investigate the acute effects of comparatively low doses of THC on working memory task performance and associated neuronal activity in the prefrontal cortex. We hypothesized that activation of cannabinoid receptors at these doses would influence activity patterns of excitatory cortical neurons associated with behavioral performance.

Methods: Before training, rats were injected with the genetically encoded calcium indicator AAV1.CamKII.GCaMP6f and chronically implanted with a lens probe in the prelimbic prefrontal cortex for in vivo single photon calcium imaging. Adult male and female rats were then trained on a delayed-match-to-sample working memory task to receive a sucrose pellet reward. Imaging was conducted during working memory test sessions, where rats were injected (i.p.) with 0.5 mg/kg THC, 0.75 mg/kg THC, 1.0 mg/kg rimonabant, or vehicle.

Results: Injection with only the highest dose of THC tested reduced the number of trials initiated during the session but did not impact task accuracy. There was a significant increase in population-level activity during the delay phase preceding an incorrect response relative to activity preceding a correct response. Both THC and rimonabant reduced calcium event rates during the delay phase prior to an incorrect trial. Rimonabant, but not THC, reduced calcium event rates across the whole session while THC, but not rimonabant, enhanced calcium event rates specifically during the delay phase.

Conclusion: We found that THC, at doses low enough to produce minimal behavioral effects, enhanced activity of principal neurons in the prelimbic prefrontal cortex that is specific to task performance. These results can be used to consider both the acute and long-term effects of different levels of THC exposure on cognitive performance.

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenter: Rebecca Thurston, PhD

Current Position: Professor of Psychiatry and SWAN Principal Investigator

Presenter's Email Address: thurstonrc@upmc.edu

Resource(s): Study of Women's Health Across the Nation

Description: The Study of Women's Health Across the Nation (SWAN) is a longitudinal cohort study of midlife aging in women. SWAN is designed to investigate the natural history of the menopause transition and the impact of the menopause and midlife aging on women's health later in life. In 1994-1996, 3302 women across five racial / ethnic groups (White, Black, Chinese, Japanese, Latina) and aged 42-52 were recruited. Over the subsequent 20+ years, participants have undergone 16 study visits that have included assessments of mental health and psychosocial function, endocrine health, cardiovascular health, gynecologic health, body composition, bone health, and physical and cognitive function. SWAN participants are returning in 2021-2023 for their 17th study assessment. Collected data are banked and available for use by collaborators.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Eunjin L. Tracy, PhD

Current Position: Postdoctoral Scholar

Presenter's Email Address: tracyel@upmc.edu

Title: Homeostatic sleep regulation and circadian rhythmicity are intact in older adults with insomnia

Author(s): Tracy E. L¹, Zhang J¹, Wilckens K¹, Krafty R², Hall M¹, & Buysse D¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Biostatistics & Bioinformatics, Emory University

Introduction: Research on insomnia-related change in sleep mechanisms has found that dysregulation of the homeostatic sleep drive and circadian rhythmicity are related to the development or maintenance of insomnia. Age-dependent alterations in homeostatic sleep and circadian regulatory processes may also contribute to insomnia among older adults. The current study examined whether homeostatic sleep drive and circadian rhythmicity differ in older adults with insomnia (OAI) compared to older good sleepers (GS).

Methods: OAI (n=37) and GS (n=30) participated in a 62-hour in-lab study with sleep deprivation and constant routine paradigms. Homeostatic sleep drive was assessed by examining the effect of sleep deprivation on delta EEG power (0.5-4 Hz) during non-rapid eye movement sleep, theta EEG power (4-8 Hz) during wakefulness, and sleep latency. Circadian rhythm was assessed with salivary melatonin (phase and amplitude), core body temperature (phase, amplitude, and mesor), and sleep latency during a constant routine paradigm. Mixed models were used to assess interactions of group with homeostatic sleep and circadian effects.

Results: Compared to GS, OAI showed a greater linear increase in wake theta power as a function of sleep deprivation, but the two groups did not show differential responses to sleep deprivation in delta EEG during NREM or in sleep latency tests. The two groups did not differ in circadian phase or amplitude. OAI had significantly elevated core body temperature mesor compared to GS.

Conclusion: Circadian rhythm amplitude and phase were similar in OAI compared to GS. Homeostatic sleep regulation was intact in OAI compared to GS; theta EEG power during wakefulness suggested a greater homeostatic response in OAI. Elevated body temperature mesor in OAI may indicate elevated physiological arousal. These findings suggest that effective treatments for insomnia in older adults may leverage intact sleep and circadian regulatory mechanisms, rather than reverse defective sleep and circadian regulation.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Aliona Tsypes, PhD

Current Position: Postdoctoral Scholar

Presenter's Email Address: tsypesa@upmc.edu

Title: Delay Discounting in Suicidal Behavior: Myopic Preference or Inconsistent Valuation?

Author(s): Tsypes A¹, Szanto K¹, Bridge J^{2,3}, Brown V¹, Keilp J⁴, Dombrovski A¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Abigail Wexner Research Institute at Nationwide Children's Hospital; ³Department of Pediatrics, Psychiatry & Behavioral Health, The Ohio State University College of Medicine; ⁴Department of Psychiatry, Columbia University

Introduction: Prior research has sought to explain the predisposition to suicidal behavior (SB) in terms of a myopic preference for immediate over delayed rewards generating mixed evidence. This ambiguity may be due to the assumption that a true consistent preference for immediate reinforcers constitutes a stable pathological trait. However, empirical evidence suggests that individuals prone to SB may engage in suboptimal decision-making due to a failure to consistently estimate the value of available choice options. We examined whether predisposition to suicidal behavior is better explained by 1) an excessive focus on short-term outcomes or by 2) a general failure to consistently estimate the value of available options.

Methods: These two competing hypotheses were tested using a delay discounting task in 622 adults (suicide attempters with depression, suicide ideators with depression, nonsuicidal participants with depression, and healthy controls) recruited across three sites through inpatient psychiatric units, mood disorders clinics, primary care, and advertisements.

Results: Multi-level models revealed group differences in valuation consistencies in all three samples, with high-lethality suicide attempters exhibiting less consistent valuation than all other groups in Samples 1, 3 and less consistent valuation than the healthy controls or participants with depression in Sample 2. In contrast, group differences in preference for immediate versus delayed rewards were observed only in Sample 1 and were due to the high-lethality suicide attempters displaying a weaker preference for immediate rewards than low-lethality suicide attempters. The findings were robust to confounds.

Conclusion: Our findings suggest that inconsistent valuation rather than a true preference for immediate gratification is part of vulnerability to SB. These results have implications for the understanding of real-life decision-making during a suicidal crisis suggesting that it is the noisy (rather than strategic) decision-making that undermines the consideration of deterrents and the benefits of alternative solutions.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Salome Vanwoerden, PhD

Current Position: Postdoctoral Fellow

Presenter's Email Address: vanwoerdens@upmc.edu

Title: Autonomic nervous system response to conflict in youth interact with parents' supportive and non-supportive responses to predict borderline personality disorder symptoms

Author(s): Vanwoerden S¹, Vine V^{1,2}, Byrd A¹, Jennings JR¹, Stepp S¹

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Psychology, Queen's University

Introduction: According to biopsychosocial theories of borderline personality disorder (BPD), non-supportive and supportive parenting predict BPD development, by interacting with biological vulnerabilities. Sympathetic (PEP) and parasympathetic (RSA) responses, especially their relative strength (i.e., cardiac autonomic balance (CAB) and regulatory capacity (CAR)), may characterize youths' sensitivity to parenting. We tested interactions between CAB and CAR with supportive and non-supportive parenting in predicting baseline levels and trajectories of BPD symptoms.

Methods: N=162 psychiatric youth (Mage=12.03; 47% female) engaged in a conflict discussion with their parents. PEP and RSA were measured continuously and used to calculate CAB and CAR. Parents and youth reported on supportive and non-supportive parenting. Youth reported on BPD symptoms at baseline and at 9- and 18-month follow-up.

Results: Latent BPD levels and trajectory of change were modeled. Increased sympathetic dominance amplified the effect of non-supportive parenting on adolescent BPD outcomes, predicting higher baseline BPD symptoms and slower decreases over time. Parasympathetic dominance amplified the protective association of supportive parenting with BPD outcomes, predicting fewer BPD symptoms at baseline. Sympathetic/parasympathetic coactivation independently predicted a slower decline in BPD symptoms.

Conclusion: Results support contemporary developmental models of biological sensitivity to context, in which biological vulnerabilities, indexed here by CAB and CAR, interact with supportive and non-supportive parenting to shape BPD development.

**Pitt Psychiatry Research Half Day and Research Resources Review
Scientific Poster Abstract**

Presenter: Anna Wears, BA

Current Position: Research Specialist

Presenter's Email Address: wearsa@upmc.edu

Title: Concordance of Model-Based Reinforcement Learning in Mothers and Daughters: The Impact of Maternal History of Major Depression

Author(s): Wears A, Brown V, Price R, Woody M

Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Learning to make goal-directed choices (i.e., model-based strategies) is a skill strengthened across development that is partially honed through parental modeling. Major Depressive Disorder (MDD) may disrupt the use of model-based strategies, with those suffering more likely to resort to a model-free valuation system (i.e., prioritizing choices only based on recent rewards). Because maternal MDD increases risk of transmitting cognitive and learning vulnerabilities from mother-to-offspring, the current study examined the impact of maternal depression on both mothers and daughters' use of reinforcement learning strategies, as well as the concordance between mothers' and daughters' strategies.

Methods: Participants included 43 never-depressed adolescent girls (13-15 years) and their mothers, 56% of whom had a history of MDD in their daughter's lifetime. Mothers and daughters completed a sequential reinforcement learning task that has been shown to dissociate model-free and model-based learning strategies in both adolescents and adults.

Results: Among mothers, the use of model-free, but not model-based, strategy was apparent. Daughters also displayed an absence of model-based strategy and exhibited model-free strategy at a trend-level. Maternal history of MDD did not significantly moderate the use of reinforcement learning strategies for either mothers or daughters. However, among dyads with, but not without, a history of maternal MDD, there was significant concordance between mothers' and daughters' use of both model-free and model-based reinforcement learning strategies.

Conclusion: These findings provide preliminary evidence that the use of model-free and model-based reinforcement learning strategies may be passed down from mothers with a history of MDD to their offspring. Because disruptions in reinforcement learning have been implicated in both the development and maintenance of MDD, the current results suggest that future research should consider the role of reinforcement learning strategies in the intergenerational transmission of depression, as well as the genetic and environmental influences that might shape such strategies.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

POSTER WITHDRAWN BY PRESENTER

**Pitt Psychiatry Research Half Day and Research Resources Revue
Research and Clinical Resources Poster Abstract**

Presenter: James D. Wilson, PhD

Current Position: Assistant Professor of Psychiatry

Presenter's Email Address: wilsonj41@upmc.edu

Resource(s): Network-Analytic Tools for Studying Functional and Structural Connectivity

Description: Network analysis is one of the prominent multivariate techniques used to study structural and functional connectivity of the brain. In a network model of the brain, vertices are used to represent voxels or regions of the brain, and edges between two nodes represent a physical or functional relationship between the two incident regions. Structural connectivity networks are typically constructed in one of two ways: edges can represent the concentration of white matter tract connections measured by diffusion tensor imaging (DTI), or edges can represent correlations of white or grey matter intensities measured with magnetic resonance imaging (MRI). Functional connectivity networks model the relationships of regions across some time-series of activation like those measured through functional MRI (fMRI) or electroencephalogram (EEG).

Network investigations of connectivity have produced many important advances in our understanding of the brain, including identifying general organizing principles of the whole-brain which have helped explain the brain's ability to minimize wiring costs while exhibiting robust transfer and integration of information across regions. They have also advanced our understanding of processes across many domains including learning and memory, cognitive control, emotion, and disease.

The computational burden and sometimes vague interpretability of network models can make one hesitate about their use. I am a new faculty member in the Department of Psychiatry with training in Statistics and Biostatistics with expertise in the development and analysis of network methodology to study brain connectivity. If you have brain imaging data that is under-utilized, or just want to know about how network-driven techniques can help in your study, I am happy and excited to talk to you.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

Presenter: Tyia Wilson, PhD

Current Position: Postdoctoral Researcher

Presenter's Email Address: tkw13@pitt.edu

Title: The Role of Time and Space: A Multidimensional Approach to Exploring the Impact of Racism on Black Youth

Author(s): Wilson T¹, Riley A², Khetarpal S², Abernathy P³, Booth J⁴, Culyba A²

Affiliation(s): ¹Department of Psychiatry, University of Pittsburgh School of Medicine; ²Department of Pediatrics, University of Pittsburgh School of Medicine; ³Neighborhood Resilience Project; ⁴University of Pittsburgh School of Social Work

Introduction: Black youth are disproportionately impacted by violence. Discrimination experiences may create additional challenges for youth recovering from violence exposure. This study linked innovative social network and ecological momentary assessment (EMA) methods to elucidate how racism perceptions influence stress, post-traumatic stress (PTS) and safety among Black youth.

Methods: Twenty-five Black youth (14-19 years-old, 58% female) who had witnessed violence within the past three months completed a baseline survey that assessed discrimination experiences, stress, PTS, and their key sources of support. Youth also completed EMAs three times daily for two weeks (49% response rate) about their location, people they were with, their current emotional state and in-the-moment racism perceptions. Multilevel models estimated the relationship between participants' perception of racism in a space and feelings associated with stress, PTS symptoms, and perceptions of safety. Models included both overall and momentary perceptions of racism in place to examine both time-dependent and time varying perception of racism.

Results: Overall, 76% of youth reported at least one discrimination experience, with 36% reporting being called racially insulting names, 32% being hassled by the police and 36% endorsing moderate to severe PTS. In multilevel models, youth who reported higher levels of perceived racism reported higher levels of stress ($B=.50, p=.001$), PTS ($B=.52, p=.001$), and lower levels of perceived safety ($B=-.50, p=.000$). Racism perception was associated with lower levels of perceived safety ($B=-.09, p<.01$).

Conclusion: Using an innovative intensive longitudinal design, we identified how being in discriminatory spaces negatively impacted youth's stress, PTS, and safety. This study is novel in examining moment-to-moment racism experiences and its consequences among Black youth who experienced violent events. Interventions attuned to place-based experiences of discrimination may help support the mental health of Black youth exposed to violence.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Scientific Poster Abstract**

POSTER WITHDRAWN BY PRESENTER

**Pitt Psychiatry Research Half Day and Research Resources Revue
Research and Clinical Resources Poster Abstract**

Presenter: Sue Clifton, MEd

Current Position: Research Recruitment Facilitator

Presenter's Email Address: cliftons@pitt.edu

Resource(s): The University of Pittsburgh Clinical and Translational Science Institute

Description: CTSI, which was launched in 2006 as one of the 12 inaugural Clinical and Translational Science Award (CTSA) Hubs and has received over \$327M from federal, foundation, and industry sponsors since its inception, provides education, connections, funding, tools, and services to advance clinical and translational science across the University's six health sciences schools and UPMC. The CTSI mission is to "accelerate the dissemination and implementation, and hence the impact, of translational research."

CTSI is formally organized in 12 service cores that facilitate and support study team assembly, study design, study conduct, and dissemination and implementation. CTSI services include assistance with all aspects of the research process: statistical and study design, data collection and management, data analysis and modeling, finding collaborators and research resources, preparing protocols and documents for regulatory review, addressing ethics considerations, stakeholder engagement, study recruitment, single and multi-site clinical trial planning, and commercialization support. The CTSI Pitt+Me Research Participant Registry and recruitment platform uses ICD-9/10 diagnoses and demographics from the EHR plus participant-reported preferences to algorithmically match >250K registry participants with specific studies, a process that has resulted in the referral of >170K participants to >960 studies over the past decade.

CTSI also provides training, including formal degree programs through the Institute for Clinical Research Education, and continuing education for all research team members (community, staff, students/trainees, faculty) on good clinical and research practice and the responsible conduct of research. Online playbooks provide on-demand, asynchronous support in all these areas as well, and multiple pilot funding programs provide >\$500K in grants annually.

**Pitt Psychiatry Research Half Day and Research Resources Revue
Research and Clinical Resources Poster Abstract**

Presenter: George Stetten, MD, PhD

Current Position: Professor of Bioengineering

Presenter's Email Address: stetten@pitt.edu

Resource(s): Visualization and Image Analysis (VIA) Lab, 434-435 Benedum Hall

Additional Presenter: Minjie Wu, PhD

Current Position: Assistant Professor of Psychiatry

Presenter's Email Addresses: minjiewu@gmail.com

Description: Automated algorithms to extract and analyze 3-D MRI vascular tree structures

The Visualization and Image Analysis Laboratory in the Department of Bioengineering is working with the Geriatric Psychiatry Neuroimaging Laboratory to develop automated algorithms to facilitate analysis of three-dimensional vascular tree structures in MRI images of the brain. These algorithms aim to reduce the extensive labor and inter-user variability of manual segmentation, while operating truly in 3D rather than on 2D projections of the underlying 3D data. The underlying principle is to find paths of maximum connectivity given a locus of starting and ending locations, allowing paths to combine given the expected direction of branching in the vascular structures. The algorithms provide local measures of vessel diameter, tortuosity, and branching pattern over an entire region of a vascular tree in a single automated pass. We believe these measures may represent early pre-clinical markers of brain pathology across a variety of mental health disorders. Specific algorithms have been developed for two applications: (1) Segmenting small veins in the white matter surrounding the lateral ventricles in susceptibility weighted images magnetic resonance (MR) images from an ultra-high field (7T) scanner, assuming that these veins branch outward from the lateral ventricles into the surrounding white matter; (2) Segmenting arterial structures from time-of-flight MR images from the 7T scanner branching out from the Circle of Willis along the middle cerebral arterial tree. Since the direction of this branching is less uniform, the algorithm has been adapted to allow for vessels to curve back upon themselves, by first producing a height-map down which branching patterns are found by following the steepest slope, analogous to water flowing down to connect the tributaries of a river. Both algorithms require minimal manual initialization and are computationally efficient (< 10 minutes).

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenter: Ann Cohen, PhD

Current Position: Associate Professor of Psychiatry

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Resource(s): Molecular Biomarkers in Psychiatry Program

Description: The Molecular Biomarkers in Psychiatry Program was formed in 2020 to better integrate PET and blood-based biomarkers into the department of Psychiatry. We have been able to drive a coordinated effort to compile a comprehensive imaging database, pooling together all available imaging b-amyloid (Ab), tau and MRI studies in a single database, including the ongoing -and labor intensive- transformation of all amyloid imaging studies -dating back to 2004- into Centiloids. In collaboration with Dr Mason and Dr Lopresti and their team from the PET Center, we have developed and implemented a pipeline, the Biostatistical Estimation of Tau Threshold Harmonization (BETTH), to determine tau positivity (T+).

Additionally, in collaboration with PET center have established a novel PET tracer, [¹⁸F]SMBT-1, a tracer for MAO-B and proxy measure for brain astrogliosis for use in neurodegenerative and psychiatric conditions. We also are currently exploring PET tracers for M1 muscarinic (mAChR) receptors.

Finally, for blood-based biomarkers of Alzheimer's disease, in collaboration with Dr Yates' Mass Spectrometry lab and Dr Karikari's SIMOA lab we have started to standardize the procedures for blood collection across all studies that require blood biomarkers. Given that the preanalytical conditions heavily affect the outcomes, the standardization will guarantee robust and comparable blood biomarker results across platforms and studies.

The availability and implementation of a wide spectrum of biomarkers will allow a better characterization of individuals with neurodegenerative and psychiatric conditions (eg. the AT(N) classification) as well as in the normal aging population.

**Pitt Psychiatry Research Half Day and Research Resources Review
Research and Clinical Resources Poster Abstract**

Presenters: Sarah Forster, PhD, Lora McClain, PhD, Caitlan Tighe, PhD

Current Positions: VA Career Development (CDA) and MVP (Early Career) Awardees

Presenters' Email Addresses: Sarah.Forster2@va.gov; Lora.McClain@va.gov; Caitlan.Tighe@va.gov

Resource(s): Mental Illness Research, Education and Clinical Center (MIRECC), Veterans Health Foundation (VHF) and the Behavioral Health Service, VA Pittsburgh Healthcare System

Description: The MIRECC, the VHF Clinical Trials Center, Basic Science Laboratories and the Research Service of the VA Pittsburgh Healthcare System are housed in the contemporary 3-story, 100,000 square-foot Research Office Building located on the University Drive (UD) Campus of the VA Pittsburgh Healthcare System, adjacent to the upper campus of the University of Pittsburgh and co-located with the inpatient and outpatient facilities of the Behavioral Health Service. Researchers have access to the VA's National Corporate Data Warehouse (CDW) for big data science, predictive analytics and health services research. The VA Informatics and Computing Infrastructure (VINCI) is a national resource that supports VA researchers' access to the CDW and the VA Million Veterans Program (MVP), the world's largest collection of genotypic, medical record and clinical phenotypic data—currently including over 850,000 Veteran volunteers. The Precision Mental Health theme and mission of the VISN 4 MIRECC supports innovative research to enhance the quality of mental health services and outcomes for Veterans with mental health conditions. Using predictive analytics, decision sciences, computer engineering and implementation science research strategies, VA MIRECC's clinical, rehabilitation and health sciences investigators work to engineer new treatment delivery platforms, clinical decision-making and optimal matching of clinical interventions to patients. Basic and clinical neuroscience investigators have received VA Merit Award funding to support investigations of basic neural mechanisms that can inform the development of novel treatments for addictive disorders and the cognitive and motivational deficits of schizophrenia.