

Abstract Book

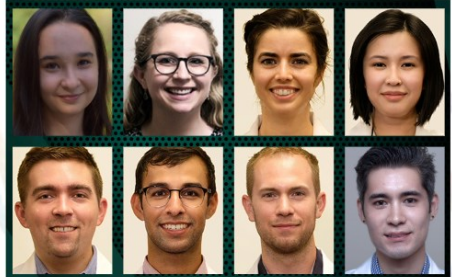
Academic Psychiatry Day 2024

Expanding Diversity,
Equity, and Inclusion in
Psychiatric Research



Friday June 21
10:45AM to 4:00PM

Vanderbilt Psychiatric Hospital
Conference Center and Gym



Oral Presentations
Sessions 1 and 2



Panel Discussion



Poster Presentations
Sessions A and B

CME/CE Credits: 3 credit hours

This activity is funded by the Luton Lecture Fund, the Hollender Lecture Fund and the Orr Lecture Fund.
This educational event received no commercial support.

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CME/CE Credits:

This activity is sponsored by the Luton Lecture Fund and the Orr Lecture Fund and the Department of Psychiatry and Behavioral Sciences.

This educational activity received no commercial support.

Heather Ward, MD, M.E. Wood, PhD and Rachael Muscatello, PhD, CE Activity Directors, have no financial relationships related to the content of this activity to disclose.

For detailed CME/CE information about this session, please visit

<https://vumc.cloud-cme.com/course/courseoverview?P=0&EID=94324>



AMA PRA Category 1 (1.00)



CE (APA) (1.00)

Attendance (1.00)

Welcome to the 2024 Academic Psychiatry Day!

From the APS Organizing Committee

The theme of this year's Academic Psychiatry Day is Expanding Diversity, Equity, and Inclusion in Psychiatric Research. Our invited panel of speakers will discuss 1) recruiting diverse trainees and faculty, 2) enhancing inclusion of research participants, and 3) improving equity in dissemination and benefits of psychiatric research and will be facilitated by moderator Dr. Barrington Hwang. For the poster sessions, similar to last year, we have grouped the posters into sessions by themes: 1) Neurodevelopment, Aging, & Cognitive; and 2) Addiction, Consultation-Liaison, Forensics, Medical Education, Mood, & Psychosis. You may use this information to plan your experience and connect with your colleagues.

This year's Academic Psychiatry Day will take place in the Vanderbilt Psychiatric Hospital, with oral presentations in Luton Conference Room and the two back-to-back poster sessions in the gym. Suggested routes between the Luton Conference Room and gym are shown on the back cover of the abstract book.

Finally, the Academic Psychiatry Day Committee wishes to offer our heartfelt congratulations to all of this year's graduates and best wishes and success on their journeys.



Heather
Ward, MD



Kimberly
Albert, PhD



Alex Bettis, PhD



Lauren
Bowen, PhD



Brandee
Feola, PhD



Anna
Huang, PhD



Barrington
Hwang, MD



Rachael
Muscatello, PhD



Maxwell
Roeske, MD, PhD



Jo Ellen
Wilson, MD, PhD



Jennye
Laws-Woolf

Schedule

10:15-10:45am	Coffee and Poster Setup VPH 1st floor Conference Center
10:45-10:50am	Welcome and Introduction Luton Lecture Hall, VPH 1206
10:50-11:50am.....	Oral Session #1
11:50-12:00pm.....	Break and Pick up Box Lunch
12:00-1:00pm	Collaboration Panel
1:00-1:10pm.....	Break and transition
1:10-2:10pm	Poster Sessions VPH Gym
1:10-1:40pm	Poster Session A (1-20)
1:40-2:10pm	Poster Session B (21-42)
2:20-3:20pm	Oral Session #2 Luton Lecture Hall, VPH 1206
3:20-3:25pm	Closing Remarks
3:25-4:00pm	Ice Cream Social

Acknowledgements

The Department of Psychiatry and Behavioral Sciences would like to acknowledge Aaron Howard and the BRET Office for the use of today’s poster stands.

Poster Session Awards

Awards will be given in the categories of predoctoral and postdoctoral poster. The winning posters will receive a small prize and will have their poster displayed on one of the poster displays on the 3rd floor of Vanderbilt Psychiatric Hospital.

Panel discussion:

Expanding Diversity, Equity, and Inclusion in Psychiatric Research



André L. Churchwell, MD

Senior Advisor to the Chancellor on Inclusion and Community Outreach
Levi Watkins, Jr. M.D. Chair
Professor of Medicine (Cardiology)
Professor of Radiology and Radiological Sciences
Professor of Biomedical Engineering.

**Jennifer Cunningham Erves,
PhD, MPH, MAEd, MS, CHES**

Associate Professor, Department of Health Policy
Director of Community Engaged Research, Office of Health Equity



Vivian Gama, PhD

Associate Professor
Department of Cell and Developmental Biology
Associate Dean for Equity and Inclusive Mentoring
Basic Sciences, School of Medicine

Nelly-Ange Kontchou, MD, MBA

4th year surgical resident
Co President, Minority Housestaff for
Academic and Medical Achievement
Vanderbilt University Medical Center



In conjunction with the theme for this year - ***Expanding Diversity, Equity, and Inclusion in Psychiatric Research***—our invited panel of speakers will be led in discussion by Dr. Barrington Hwang on the topics of:

- 1) recruiting diverse trainees and faculty,
- 2) enhancing inclusion of research participants, and
- 3) improving equity in dissemination and benefits of psychiatric research.

Moderator: Barrington Hwang, MD

Fellow, Child and Adolescent Psychiatry
Vanderbilt University Medical Center



Presenters

Oral Session 1

10:50am

Eleonora Sadikova, M.Ed., PhD Candidate

Predictors of self-esteem in autistic adolescents.

Haley Potts, PhD

How Defense Attorneys Decide: A Mixed Method Exploration of Competency Evaluation Referrals

Kalli Burdick, MD

Perinatal Anxiety

Tami Feng, MD

An exploration of the patient-provider relationship: a historical perspective

Poster Session A

1:10-1:40pm

Poster Presenter

Aging and Cognitive

- 1 **Kiara Baker, BS**
Rumination exacerbates the adverse effects of depressive symptoms on episodic recall in late-life depression

 - 2 **Alexander C. Conley, PhD**
Assessing the feasibility of using Neuroflex, a neuroplasticity-based computerized cognitive remediation technique in patients with Mild Cognitive Impairment

 - 3 **Jo Ellen Wilson, MD PhD, MPH**
Exposure to Antipsychotic Medication is Associated with Less Days Alive and Free from Catatonia in Critically Ill Patients: Results from the Delirium and Catatonia Prospective Cohort Study
-

Neurodevelopment

- 4 **Isaac Baldwin, MD**
The Effectiveness of the Lorazepam Challenge Test in Pediatric Catatonia: A Multisite Retrospective Cohort Study

 - 5 **Seri Lim, BA**
Symptoms of Catatonia Observed in Down Syndrome Regressive Disorder: A Retrospective Analysis

 - 6 **Alisa R. Zoltowski, PhD**
Interception and Anxiety: Within and Beyond the Autism Spectrum
-

Poster Session A continued

Poster Presenter

Neurodevelopment (continued)

- | | |
|----|---|
| 7 | Rachel E. Calvosa, BS
Examining Peer Stress and Coping in Adolescents with Autism Spectrum Disorder |
| 8 | Joshua R. Smith, MD
Exploring the Trajectory of Catatonia in Neurodiverse and Neurotypical Pediatric Hospitalizations: A Multicenter Longitudinal Analysis |
| 9 | Rachel Marlowe, M.Ed.
Associations Between Momentary Positive and Negative Affect and Emotion Regulation Processes in High-Risk Adolescents |
| 10 | Camille Archer, BA
Interactive Effect of Irritability and Negative Life Events on Internalizing Symptoms |
| 11 | Hee Jung Jeong, MS
Linking Early Life Stress and Psychopathology through Neural Correlates |
| 12 | Leighton Durham, MA
A Hierarchical Model of Internalizing Problems in Youth and Associated Brain Volume Differences |
| 13 | Amber J. Morrow, MA, PhD Candidate
Developmental and Intellectual Disabilities in Children Involved in Child Welfare |
| 14 | Meredith Gruhn, PhD
Autonomic Nervous System Coordination Alters PTSD Risk Following Childhood Maltreatment |
| 15 | Michael H. Levin, MD
GRADEing Evidence for Pharmacotherapy for Substance Use in Children and Adolescents: A Systematic Review |
| 16 | Hari Srinivasan, BA
Navigating the Near: VR Investigations of Peripersonal Space in Autism |
| 17 | Kimberly S. Bress, BA
Sensorimotor integration across the upper-lower and right-left face halves at the level of the cortex - Replication of findings in the ABIDE dataset |
| 27 | Allison M. Lake, BSc (Moved from Poster Session 2)
Genome-wide association study of short-term weight change following atypical antipsychotic exposure in a hospital population |
-

Poster Session B

1:40-2:10pm

Poster Presenter

Psychosis and Mood

- 18 Raza Sagarwala, MD**
The Effects of Mindfulness-Based Interventions on White Matter Microstructure: A Review of Diffusion Tensor Imaging Studies.
-
- 19 Essence Leslie, BA**
Delusional distress is associated with global emotion dysregulation in schizophrenia-spectrum disorders
-
- 20 Andrew R. Kittleston, BA**
Insula subregional volumes in early psychosis: A 2-year follow-up study
-
- 21 Gabrielle Reimann, MS**
Similarity Indices and Community Detection Within an Internalizing Symptoms Network
-
- 22 Ali Sloan, EdM, BS**
Belief Updating, Childhood Maltreatment, and Paranoia in Schizophrenia
-
- 23 Yunlai Gui, BA**
Reduced Pitch Range in Schizophrenia: Towards Quantification of Flat Affect Through Prosody and Semantic Analysis of Speech Sample
-
- 24 Lauren P. Weittenhiller, MA**
From Rebuff to Reclusion: Elevated Withdrawal in Response to Social Exclusion in Schizophrenia
-
- 25 Withdrawn**
-
- 26 Maxwell J. Roeske, MD, PhD**
Modulation of Hippocampal Hyperactivity in Schizophrenia With Levetiracetam: a Randomized, Double-Blind, Cross-Over, Placebo-Controlled Trial
-
- 27 Moved to Poster Session 1**
-
- 28 Chandler Broadbent, MA, PsyD Candidate**
Development of an integrative group-based hypnosis and CBT protocol for adults with anxiety and co-occurring health conditions
-
- 29 Tatiana Baxter, MS, BA**
Embodiment of Loneliness and Self-Disturbances in the Schizophrenia-Spectrum
-

Addiction, Consultation-Liaison, Forensics, Medical Education

- 30 Sophia H. Blyth, BA**
Adolescent Substance Use is Associated with Resting-State Network Connectivity, Psychiatric Symptoms, and Cognitive Performance
-

Poster Session B continued

Poster Presenter

Addiction, Consultation-Liaison, Forensics, Medical Education (continued)

- 31 Alvina Liang, BS**
Unique Barriers in the Creation and Maintenance of Pro-Bono Asylum Clinics in Southeastern US
-
- 32 Snehal Bindra, BS**
Peer-led Review Session Increases Confidence and Improves Preparedness for Psychiatry Clerkship NBME Shelf Exam
-
- 33 Elizabeth Sun, BS**
Investigating The Need for Pediatric Forensic Evaluations Among Medical-Student Run Asylum Clinics
-
- 34 Ashley Layne, MA**
Frequency and Relevance of Substance Use Information in Forensic Mental Health Evaluations: An Exploratory Study of Probative (vs. Prejudicial) Value
-
- 35 Amir Mohammadzadeh, MD**
Converting Weakness into Strength: Rapid Resolution of Functional Neurological Symptom Disorder with Intravenous Lorazepam
-
- 36 Shuka Park, BA**
Investigating Interactions Between the Circadian and Reproductive Systems in Female Reproduction
-
- 37 Mae A. Wimbiscus, BA**
Profiles and Management of Hand Injuries in Psychiatric Patients: a Case Series
-
- 38 Mae A. Wimbiscus, BA**
Comparing Characteristics Self-Inflicted Gunshot injuries and Assault Gunshot Injuries
-

Oral Session 2

2:20pm

Ryan Cassidy, MD, PhD
Kava Withdrawal and Kava Use Disorder

Joshua Streicher, MD
The Cultural Context of Psilocybin

Nathaniel Allen-Slaba, DO
Examining The Effects of Adjunctive Medications with ECT

Eric Strobl, MD, PhD
Automated Discovery of the Root Causes of Disease

Sadikova, ES

Predictors of self-esteem in autistic adolescents

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Self-esteem, confidence in one's own abilities, is a core facet of adolescent identity development. Autistic adolescents show lower self-esteem than neurotypical adolescents. This study aims to examine the impact of anxiety symptoms, depression symptoms, social responsiveness, and gender diversity on self-esteem. Participants included 140 autistic adolescents (Mean age: 14.59(1.06)). We used hierarchical linear regression with the Rosenberg Self-Esteem Scale as the outcome with these steps: first (sex, age, race, IQ, and parental education), second (Multidimensional Anxiety Scale for Children (MASC-2) and the Children's Depression Inventory (CDI-2)), third (Social Responsiveness Scale (SRS-2)), and fourth (Gender Diversity Scale). The first step did not significantly improve model fit. Including predictors of anxiety and depression improved model fit ($\Delta R^2=.281$, $p<.001$). Adding the autism symptoms in the third nested model also improved model fit ($\Delta R^2=.057$, $p=.013$). Finally, adding gender diversity self-report scores did not improve model fit. In the final model, higher IQ, higher autism symptoms, and higher depression scores were associated with lower self-esteem. Neither sex nor gender divergence was associated with self-esteem. Understanding factors associated with self-esteem in autistic adolescents can guide strength-based interventions that model positive social engagement and functioning.

Eleonora Sadikova, M.Ed.

Clinical Psychology Pre-Doctoral Intern

Additional Authors: Corbett, Blythe

Funding: NIH grant R01 MH111599

Keywords: autism, gender, self-esteem, mental health, adolescence

Potts H

How Defense Attorneys Decide: A Mixed Method Exploration of Competency Evaluation Referrals

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Court-ordered evaluations of competency to stand trial are nearly always triggered by referrals from defense counsel, yet there is limited research into referring attorneys' characteristics and decision-making. The current study set to fill this gap via three phases. Phase one analyzed 51 referrals to the Vanderbilt Forensic Evaluation Team (VFET) from 2015-2019 (randomly stratified by year), finding female defense attorneys more likely than their male counterparts to refer incompetent defendants for evaluation. Using thematic analyses, the second phase identified this sample's most cited reasons for referral (i.e., in descending order, psychiatric symptoms, mental health treatment history, and intellectual/cognitive impairment). Delusional thoughts, disorganized speech, and combative behavior were the most frequently described symptoms. In phase three, a new sample of referring defense attorneys (n = 28) completed an anonymous survey. Preliminary thematic analyses suggest these attorneys weigh the following factors when determining whether to refer clientele: charge severity, evaluation delay, family concern, ethical responsibility, and prosecutorial misuse of the competency evaluation process. These findings suggest defense attorneys consider a combination of clinical, legal, and extralegal factors when determining whether to refer, with implications for forensic mental health systems locally and nationwide.

*Haley Potts, PhD
Post-Doctoral Fellow*

Additional Authors: Wood, M.E., Peck, A

Funding: None

Keywords: adjudicative competency; forensic assessment; competency referrals

Burdick KA

Perinatal Anxiety

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Perinatal anxiety is a commonly encountered clinical entity with significant risk of adverse outcomes. However, it is under researched and has no formally agreed upon diagnostic criteria in the DSM. I intend to provide a brief review of the unique diagnostic features of perinatal anxiety and suggested management from recent literature.

Kalli A. Burdick, MD

PGY4

Additional Authors: Caucci, Michael

Funding: None

Keywords: Reproductive Psychiatry, Perinatal Anxiety

Feng T

An exploration of the patient-provider relationship: a historical perspective

¹ Department of Psychiatry and Behavioral Sciences, VUMC

The alliance between the patient and provider is one of the common factors of therapies and has been linked to better outcomes. The way that the relationship has been framed in the various modalities of therapy over the years has varied not only by school of thought but also by providers themselves. While it seems intuitive that having a strong rapport with the patient can improve the quality and length of the therapy, the nature of the bond itself means that over the years there have been a number of ways that great teachers of the subject have attempted to put this instinct into words. I would like to explore various historical texts on therapy from a psychoanalytic perspective and examine what is contained in the space between the therapist and the patient, and how constructing that space is navigated and communicated despite individual differences. From Freud's initial view on the patient in early psychoanalytic theory in *On the Beginnings of Treatment*, to more modern perspectives, ultimately with a reflection of how we might apply these teachings to our work as psychiatrists.

Tami Feng, MD
PGY4

Additional Authors: Liu J, Heckers S, Armstrong K, Sheffield J

Funding: None

Keywords: therapy

Baker, KB

Rumination exacerbates the adverse effects of depressive symptoms on episodic recall in late-life depression

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Late-life depression (LLD) is associated with memory deficits and executive dysfunction. Repetitive negative thinking (i.e., rumination), a depression characteristic, may also adversely impact cognition through reduced information processing and cognitive control. We hypothesized higher depressive symptoms and rumination would predict worse attention/working memory, episodic recall, and executive function performance in older adults. In a sample of LLD and elder controls, five cognitive composites were created by averaging z-scores of individual tests within each cognitive domain (attention/working memory, processing speed, language, episodic recall, and executive functions). A subset of LLD who completed both the Montgomery Asberg Depression Rating Scale (MADRS) and Ruminative Responses Scale (RRS) were used in analyses ($n=91$, mean age= 66.18 ± 4.88 years, 60% female, mean education= 14.99 ± 2.27 years, 91% Caucasian, mean MMSE= 29.41 ± 0.89 , mean MADRS= 26.13 ± 5.49 , mean RRS= 30.87 ± 10.34). MADRS and RRS were mean-centered before creation of interaction terms. After covariate adjustment, multiple regression analyses revealed a significant MADRSxRRS effect for memory only ($p=0.018$, $\eta p^2=0.064$), such that episodic recall was lower in those with both elevated depressive and ruminative symptoms. Higher levels of rumination may exacerbate the negative influence of depressive symptoms on memory recall in LLD. Interventions aimed at improving rumination in LLD may also benefit memory performance.

Kiara Baker, BS
Research Assistant

Additional Authors: Taylor, WD, Szymkowicz, SM

Funding: NIH R01MH102246, NIH R21MH099218

Keywords: Cognition, Rumination, Depression, Geriatrics, Memory

Conley AC

Assessing the feasibility of using Neuroflex, a neuroplasticity-based computerized cognitive remediation technique in patients with Mild Cognitive Impairment

¹ Department of Psychiatry and Behavioral Sciences, VUMC

The use of cognitive training as a therapeutic intervention for adults with Mild Cognitive Impairment (MCI) offers the potential for improved cognition without the adverse effects seen in many pharmacological trials. A novel cognitive enhancement strategy is Neuroflex, which aims to boost cognitive performance by training clinically relevant cortical networks. In MCI patients, the goal is by engaging networks that support memory function through nCCR, this will produce sustained improvements in functioning. The present study is a preliminary investigation into the feasibility and tolerability of Neuroflex in adults with MCI. This open-label study required participants to complete 45-hours of Neuroflex across six weeks. During and following the intervention, participants' completed questionnaires and tasks that assessed potential changes in cognitive performance, which would indicate markers of functional engagement for future randomized trials. The use of Neuroflex was well tolerated, as of the sixteen participants who have been enrolled in treatment, fourteen have successfully completed training. Preliminary results have also showed improvements in self-reported functioning, as well as in cognitive performance. These results indicate the potential for using Neuroflex as an augmentation to other therapeutics in adults with MCI and support the further investigation of Neuroflex with a randomized controlled trial.

Alexander C. Conley, PhD

Research Assistant Professor of Psychiatry and Behavioral Sciences

Additional Authors: Vega, JN, Nguyen, NTP, Patel, S, Morimoto, SS, Newhouse PA

Funding: Vanderbilt Memory and Alzheimer's Center Pilot and Feasibility Award.

Keywords: Mild Cognitive Impairment, Cognitive Training, Attention, Memory, Digital Medicine

Wilson JE

Exposure to Antipsychotic Medication is Associated with Less Days Alive and Free from Catatonia in Critically Ill Patients: Results from the Delirium and Catatonia Prospective Cohort Study

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Our aim was to explore whether exposure to antipsychotic medication and higher cumulative dosage associated with an increased risk of catatonia compared to no exposure or lower dosage among critically ill adults in the intensive care unit.

In this single center prospective cohort study of 270 critically ill adult patients, those who were ever exposed and those who were exposed to higher cumulative dosages of antipsychotics had a decreased chance of more days alive and free from catatonia (evaluated using the Bush Francis Catatonia Rating Scale and caseness determined using DSM-5 criteria) compared to those who were never exposed and those who were exposed to lower dosages. In summary, we conclude that exposure to antipsychotic medication and higher dosage is associated an increased risk of catatonia in critically ill patients.

Jo Ellen Wilson, MD, PhD, MPH

Assistant Professor of Psychiatry and Behavioral Sciences

Additional Authors: Mina GN, Trey McGonigle T, Liu J, Brummel NE, Patel MB, Smith JR, Heckers S, Pandharipande PP, Dittus RS, Ely EW

Funding: Tennessee Valley Healthcare System Geriatric Research (GRECC), NIH grant UL1 TR000445. The authors would like to acknowledge that data for this cohort was collected using support from NIH grants AG035117, HL111111, R01GM120484, and K76AG054864.

Baldwin I

The Effectiveness of the Lorazepam Challenge Test in Pediatric Catatonia: A Multisite Retrospective Cohort Study

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Catatonia is a neuropsychiatric disorder associated with changes in behavior and affect. In adults, catatonia can respond rapidly to treatment with benzodiazepines as part of the "lorazepam challenge test." The acute effectiveness of benzodiazepine treatment in pediatric catatonia, however, has received less study. This study reports catatonia severity as measured by the Bush Francis Catatonia Rating Scale (BFCRS) in pediatric patients before and after treatment with lorazepam. A multicenter retrospective cohort study was conducted with patients aged 18 and younger with a clinical diagnosis of catatonia and assessment using the Bush Francis Catatonia Rating Scale (BFCRS) before and after treatment with lorazepam. Prior to treatment, patients had a mean BFCRS score of 16.6 ± 6.1 , which significantly reduced to 9.5 ± 5.3 following treatment with lorazepam (mean paired difference 7.1; $t=9.0$, $df=53$, $p<0.001$), representing a large effect size (Hedges's $g = 1.20$; 95% CI: 0.85 to 1.55). Lorazepam resulted in a rapid improvement in catatonia severity in pediatric patients, with a large effect size. Further research is needed into optimal lorazepam dosing and duration of treatment response in pediatric patients.

Isaac Baldwin, MD
PGY3

Additional Authors: Luccarelli, J, McCoy, TH, York, T, Fricchione, G, Fuchs, C, Smith, JR,

Funding: National Institute of Mental Health (T32MH112485; JL) and National Institute of Child and Human Development (1P50HD103537; JRS)

Keywords: catatonia, child and adolescent psychiatry, psychopharmacology, cohort study, neurodevelopmental disorders

Lim, S

Symptoms of Catatonia Observed in Down Syndrome Regressive Disorder: A Retrospective Analysis

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Down Syndrome Regressive Disorder (DSRD) is a neuropsychiatric condition associated with severe symptomology and a negative impact on quality of life. DSRD frequently presents with catatonic symptoms such as abnormal movements or behaviors but only a few studies have reported specific catatonic symptoms that occur in DSRD. We conducted a retrospective analysis of medical records to identify patients with diagnoses of Down Syndrome with catatonic symptoms who presented for clinical care between 1/1/2018 and 12/1/2023. Patients who had a diagnosis of or met the criteria for DSRD, catatonia as confirmed in clinical documentation, and had a full Bush Francis Catatonia Rating Scale (BFCRS) documented at the time of initial diagnosis were included in the study. Nine patients met the criteria for DSRD, and all nine patients were diagnosed with catatonia. The mean BFCRS score on initial evaluation was 17.3 (SD=7.0) and the mean number of positive catatonia signs was 11.1 (SD=1.5). Staring was present in all cases, followed by mutism, grimacing, and rigidity. Catatonia is severe if undiagnosed and untreated. Future research is needed to assess specific symptoms of catatonia in DSRD and longitudinal outcomes to assess optimal treatment means.

Seri Lim, BA
Research Coordinator

Additional Authors: Smith JR, Baldwin I, Luccarelli J

Funding: None

Keywords: Down syndrome, Down syndrome regressive disorder, Regression, Catatonia, Neurodevelopmental

Zoltowski AR

Interoception and Anxiety: Within and Beyond the Autism Spectrum

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Background. While exact estimates vary, most studies suggest elevated rates of anxiety symptoms and diagnosed anxiety disorders in autistic compared to non-autistic individuals. The sensory processing differences that are associated with autism may be one of several features that impact the prevalence and presentation of anxiety in autistic individuals. Specifically, we focus on how the sense of interoception, i.e., how we perceive sensory information from within our bodies, contributes to anxiety in autism.

Methods. We present new findings between interoceptive perception, reported interoceptive confusion, and trait anxiety levels in a sample of $n = 38$ non-autistic and $n = 43$ autistic individuals, ages 8-55 years. **Results.** We found two components relating to interoceptive confusion: one component that closely relates to trait anxiety and one component that is distinct from anxiety. Groups showed diverging trends, such that in autistic individuals, but not non-autistic individuals, individuals who are more anxious may show greater divergence between interoceptive perceptual integration and interoceptive confusion. However, interoceptive perceptual integration was enhanced in autistic compared to non-autistic individuals.

Conclusions. Combined, these findings suggest that interoceptive-focused treatments for anxiety in autism may especially benefit from focusing on the broader contextualization and meaning of their interoceptive signals.

Alisa R. Zoltowski, PhD
Postdoctoral Fellow

Additional Authors: Convery, CA, Eyoh, E, Plump, E, Sullivan, M, Arumalla, ER, Quinde-Zlibut, JM, Keceli-Kaysili, B, Lewis, B, Cascio, CJ

Funding: NIMH grant MH102272, NSF grant 1922697

Keywords: Interoception, autism, anxiety, sensory processing, mindfulness

Calvosa RE

Examining Peer Stress and Coping in Adolescents with Autism Spectrum Disorder

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Increased social complexity in adolescence can be stressful for autistic adolescents. Autistic individuals are vulnerable to bullying and negative peer relationships, and negative peer experiences are associated with maladaptive stress responses including disengagement and involuntary engagement. Adaptive responses include primary coping and secondary coping. In this study, responses to peer stress were examined in neurotypical (TD) and ASD adolescents. Participants included 224 TD and ASD adolescents age 10-13 in a longitudinal study examining puberty. Perceived social stress and coping strategies were measured using the Compas RSQ – Peer Stress. Univariate analyses of variance were conducted to assess differences between diagnostic groups in total stress, primary coping, secondary coping, disengagement, involuntary engagement, and involuntary disengagement. Results showed that TD adolescents endorsed significantly more primary ($p < 0.001$) and secondary coping ($p < 0.001$). ASD adolescents endorsed significantly more involuntary engagement ($p < 0.001$), involuntary disengagement ($p < 0.001$), and total stress ($p = 0.003$). Autistic adolescents experience significantly more peer-related stress than TD youth and use fewer adaptive strategies to cope, which can increase risk of anxiety and depression. Findings suggest that teaching autistic children social engagement skills and adaptive coping strategies may mitigate stress especially during the challenging adolescent years. Future studies are needed to measure coping throughout adolescence.

Rachel E. Calvosa, BS
Graduate Student

Additional Authors: Muscatello RA, Corbett BA

Funding: National Institute of Mental Health (MH111599 PI: Corbett)

Keywords: Autism, Stress, Coping, Adolescent, Peers

Smith JR

Exploring the Trajectory of Catatonia in Neurodiverse and Neurotypical Pediatric Hospitalizations: A Multicenter Longitudinal Analysis

¹ Department of Psychiatry and Behavioral Sciences, VUMC

This study presents a retrospective analysis of inpatient care for pediatric catatonia patients, comparing treatment responses between neurotypical patients and those with neurodevelopmental disorders (NDDs). Data was collected from two academic medical centers between 1/1/2018 to 6/1/2023, and assessments were made using the clinical global impressions-improvement (CGI-I) scale. Out of the 165 hospitalized patients, 50.3% had a baseline NDD. The median age was 15, and 164 patients were treated with a benzodiazepine with a median maximum 24-hour dose of 6 mg lorazepam-equivalents. Electroconvulsive therapy (ECT) was utilized in 14.5% of patients. Neurotypical patients had longer hospitalizations than those with NDDs. The study reveals that the probability of at least "much improvement" (CGI < 3) was 88.3%, with NDD diagnosis linked to a lower odds of clinical response. Despite similar benzodiazepine and ECT treatment across patients, neurotypical patients had a higher odds of a more favorable clinical response. The study concludes that further research under controlled conditions is crucial for optimizing catatonia treatment in youth.

Joshua R. Smith, MD

Assistant Professor of Psychiatry and Behavioral Sciences

Additional Authors: Luccarelli J, Clauss J, York T, Vandekar S, McGonigle T, Fricchione G, Fuchs C, Smith JR

Funding: NIMH (T32MH112485; JL and JAC) and NICHD (1P50HD103537; JRS)

Keywords: catatonia, cohort studies, child psychiatry, neurodevelopmental disorders

Marlowe R

Associations Between Momentary Positive and Negative Affect and Emotion Regulation Processes in High-Risk Adolescents

¹ Department of Psychiatry and Behavioral Sciences, VUMC

Emotion regulation (ER) is linked to affect and psychological symptoms in youth. Adolescents' ability to effectively regulate emotions during high-risk periods for suicide is important to understand. The current study examines adolescent ER and affect in the high-risk period following a psychiatric hospitalization. The sample included N = 39 youth ages 14-17 (M = 15.32, SD = 1.02; 61.5% female; 64.1% cisgender, 5.1% Hispanic, 56.4% LGBTQ+) with a past 30-day history of suicidal ideation (SI) or suicide attempt. Youth completed surveys about mental health and upon hospital discharge, completed a 2-week ecological momentary assessment protocol. They completed 5 surveys per day assessing current positive affect (PA), negative affect (NA), daily stressors, ER strategy use, ER efficacy, and SI severity. Preliminary analyses found that adolescents endorsed on average using two ER skills per observation. Youth reported ER efforts were moderately helpful (M=5.64, SD=3.15) and had moderately high self-efficacy beliefs about managing emotions in the future (M=6.37, SD=2.97). Multi-level modeling analyses found ER efficacy significantly predicted lower NA ($p < .001$) and higher PA ($p < .001$). Youth NA significantly predicted higher passive ($p < .001$) and active ($p < .001$) SI, whereas PA significantly predicted lower levels of active SI ($p < .001$). We anticipate a larger sample by June 2024.

Rachel Marlowe, M.Ed
Research Coordinator

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Funding: Dr. Bettis NIH K23MH122737-04

Keywords: adolescents, emotion regulation, affect, EMA, suicide risk

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Interactive Effect of Irritability and Negative Life Events on Internalizing Symptoms

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Background. Childhood irritability and negative life events have independently been associated with the emergence and trajectory of internalizing symptoms. Here, we investigate how irritability and negative life events independently predict the course of internalizing symptoms, as well how their interaction may influence internalizing trajectories. Additionally, we examine the distinct outcomes of depressive versus anxious symptoms.

Methods. Participants included children (N = 9,228) from the Adolescent Brain Cognitive DevelopmentSM Study (ABCD Study[®]). Using linear mixed effects models, we examined the course of internalizing symptoms over three years as predicted by irritability, negative life events, and their interaction. **Results.** The presence of both higher irritability and negative life events independently predicted a decrease in anxious symptoms, and an increase in depressive symptoms over time. We also found that youth with higher irritability and more negative life events showed a decrease in internalizing symptoms over the course of three years.

Conclusions. Our findings suggest that high irritability in the presence of more negative life events may promote resilience in youth against the progression of internalizing symptoms. Future work is needed to examine the specific components of irritability that may be driving this complex interaction and the underlying behavioral mechanisms that may contribute to this effect.

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Funding: None

Keywords: adversity, irritability, childhood, internalizing disorders, trajectories

Jeong HJ

Linking Early Life Stress and Psychopathology through Neural Correlates

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Mental health problems associated with early life stress are severe, persistent, and treatment resistant. Investigating neural substrates linking early life stress and psychopathology may improve our understanding of the mechanisms contributing to how early life stress influences the developing brain, leading to long-lasting psychological and behavioral problems. Using hierarchical modeling to derive dimensional factors from multiple stressors, the current study investigated brain structures that mediate the association between early life stress and psychopathology longitudinally. The data were obtained from the Adolescent Brain Cognitive Development (ABCD) Study. Hierarchical modeling was used to derive a general factor of environmental stress that encompasses the shared variance among items reflecting diverse stressors. Mediation analyses were performed to identify regional volumes at the second-year follow-up that mediate the association between environmental stress at baseline and psychopathology symptoms at the third-year follow-up. Results indicated that general environmental stress predicted greater overall psychopathology symptoms. Smaller volumes in regions implicated in reward processing, cognitive control, emotional processing, and default-mode mediated the association between general environmental stress and psychopathology symptoms. The current study provides evidence that smaller volumes in brain regions implicated in emotional and cognitive processing may contribute to the relationship between early life stress and psychopathology.

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Funding: Brain and Behavior Research Foundation Young Investigator grant ANK, Sloan Research Fellowship ANK

Keywords: brain structure, environmental stressor, psychopathology

Durham L

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

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Internalizing psychopathology often has its onset in youth and is characterized by substantial comorbidity and heterogeneity. Internalizing disorders have been found to have both shared and distinct neural mechanisms. This project used a sample of children (N = 9,782) from the Adolescent Brain Cognitive Development Study. Symptoms were assessed with the Child Behavior Checklist and Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children. Brain structure was measured with 3T magnetic resonance imaging. Exploratory structural equation modeling and confirmatory higher order modeling was used to identify a hierarchical internalizing model. Associations between the factors and regional cortical volumes (CV), thicknesses (CT), and surface areas (SA) were examined with structural equation modeling. Modeling yielded factors for general internalizing, distress, cognitive, fear, and somatic symptoms. Inverse associations were found with 29 CVs and 47 SAs for the general factor, 25 CVs and 47 SAs for the distress factor, 56 CVs and 61 SAs for the cognitive factor, and 47 SAs for the fear factor ($p < .05$). No associations were found for CTs or the somatic factor. This study is among the first to uncover the data-driven hierarchical structure underlying internalizing problems in a youth sample and reveal associated neurostructural differences.

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Funding: None

Keywords: Internalizing psychopathology, dimensional modeling, neurodevelopment, structural MRI, youth

Morrow AJ

Developmental and Intellectual Disabilities in Children Involved in Child Welfare

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Children with intellectual and developmental disabilities (I/DD), including Autism Spectrum Disorder (ASD), are 1.5 to 10 times more likely to endure maltreatment than other children (Shannon & Tappan, 2011). Consequently, they are at a higher risk for child welfare involvement, with estimates that children in foster care have rates of I/DD that are two to five times higher than those in the general population (Shea et al., 2024; Slayter, 2016). Additionally, recent research indicates that the rate of children diagnosed with ASD has significantly increased over the past 20 years, rising from 1 in 125 to 1 in 36 children by the age of eight (Shea et al., 2024). This project seeks to better understand the unique needs of I/DD children and how involvement in child welfare impacts functioning and identification of needs and resources. Findings will be important for improving I/DD identification and assessment, as well as informing prevention efforts that may impact placement stability and permanency for children with I/DD in Tennessee's child welfare system.

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Funding: None

Keywords: Intellectual Developmental Disabilities; Child Welfare

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Autonomic Nervous System Coordination Alters PTSD Risk Following Childhood Maltreatment

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Individuals with post-traumatic stress disorder (PTSD) often exhibit dysregulation of the autonomic nervous system (ANS), characterized by heightened sympathetic nervous system (SNS) activity or reduced parasympathetic nervous system activity (PNS), which may contribute to the hyperarousal and hypervigilance symptoms commonly observed in PTSD. To date, the majority of studies have included only one measure of the ANS (i.e., SNS or PNS) without attention to the role of ANS coordination. This study examines the impact of ANS coordination (i.e., reciprocal activation of the SNS and PNS) on the association between childhood maltreatment (CM) and self-reported PTSD symptoms in a sample of 97 adolescents, ages 10-15. Sympathetic and parasympathetic nervous system activity were measured continuously during a dyadic conflict task with the adolescent's primary caregiver. Results indicate that CM was significantly associated with self-reported PTSD symptoms (Estimate = 0.32, $p = 0.007$). This association was significantly moderated by ANS coordination during interpersonal conflict (Estimate = -0.33, $p = 0.027$), such that only individuals with non-reciprocal SNS/PNS coordination demonstrated a positive association between CM and PTSD symptoms in adolescence. Findings indicate that ANS coordination may serve as a buffer against the negative impact of CM on the development of PTSD in adolescence.

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Keywords: Maltreatment; Stress Reactivity; Autonomic Nervous System; PTSD Psychosurgery

Levin MH

GRADEing Evidence for Pharmacotherapy for Substance Use in Children and Adolescents: A Systematic Review

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There is relatively little empirical evidence supporting many pharmacotherapies frequently used to treat children and adolescents; many ideas about which medications to use for these patients are extrapolated from studies in adults. In 2014, the AACAP Council approved and published the AACAP Medication Tables, presenting FDA approval status and evidence quality for psychiatric medications in pediatric patients. Our current project aims to update these tables with a more rigorous methodology. We hypothesize that the evidence supporting pharmacotherapy for adolescent substance use disorder is limited and of low quality. We designed a search strategy: to identify RCTs, open-label trials, and case reports with outcome or safety data regarding pharmacotherapy in children and adolescents with substance use in PubMed, Embase, PsycINFO, Web of Science, Cochrane Database of Systematic Reviews, and Cochrane Central Register of Controlled Trials. Preliminary searches of PubMed yielded over 8,000 results. Refinement of the specific Boolean operators PubMed search reduced this to slightly more than 2,000. We will proceed by using COVIDENCE for article exclusion and data extraction, followed by publishing the results in manuscript and summary table formats. This process will be replicated for other diagnostic categories impacting children and adolescents.

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Funding: None

Keywords: Child and adolescent psychiatry, Substance use disorders, Pharmacotherapy, Literature review, Evidence-based care

Srinivasan H

Navigating the Near: VR Investigations of Peripersonal Space in Autism

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Investigating how sensory sensitivities affect the boundaries and dynamics of peripersonal space (PPS) in autism, our study uses a virtual reality (VR) bubble-pop task integrated with EEG analysis. We hypothesize that sensory hypersensitivity leads to altered PPS boundaries and associated physiological responses. Participants, comprising 20 autistic and 20 non-autistic individuals, engage in a personalized VR task simulating PPS intrusions modulated by distance and speed. Metrics include reaction times, attempt distance, localization errors, hits versus misses, and heart rate, analyzed through Bayesian statistics. EEG analysis will reveal neural dynamics associated with sensory sensitivity and PPS engagement. Expected outcomes include heightened sensitivity in autistics, quicker modulation with stimulus changes, and a conservative response strategy with increased autonomic arousal. These anticipated findings highlight the need for tailored interventions considering sensory sensitivities to enhance PPS navigation and interaction strategies in autism.

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Funding: NSFGRFP, NISE

Keywords: Autism, hypersensitivity, peripersonal space, virtual reality, EEG,

Bress KS

Sensorimotor integration across the upper-lower and right-left face halves at the level of the cortex - Replication of findings in the ABIDE dataset

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We performed a seed based resting state connectivity analysis on resting state functional magnetic resonance images (fMRI) from n=59 typically developing and n=71 autistic adults to interrogate pairwise connections between the upper and lower somatotopic face areas of the primary sensory (S1) and primary motor (M1) cortices. Results demonstrated that in both groups, the upper face areas of S1 have equivalent functional connectivity (FC) with the upper and lower face areas of M1. In addition, the right and left face areas of S1 have equivalent FC with the ipsilateral and contralateral face areas of M1. In the typically developing sample only, lower face areas of S1 demonstrate greater FC with the lower face areas of M1, compared to the upper face areas of M1 (mean difference in Fisher transformed correlation values=1.897, CI=1.093-2.701, effect size = 0.39, Bonferroni-adjusted p-value=0.003). We then independently replicated these findings in a sample of n=106 typically developing and n=106 autistic adults from the Autism Brain Imaging Data Exchange (mean difference in Fisher transformed correlation values=2.333, CI=1.781-2.885, effect size = 0.42, Bonferroni adjusted p-value=0.003).

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Keywords: Autism, communication, facial expression, fMRI, connectivity

Sagarwala RH

The Effects of Mindfulness-Based Interventions on White Matter Microstructure: A Review of Diffusion Tensor Imaging Studies

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Mindfulness-based interventions (MBIs) are a popular treatment modality in conjunction with more traditional psychopharmacology and psychotherapy. Long-term meditators have been found to have an increased fractional anisotropy (FA) of white matter (WM) on diffusion tensor imaging (DTI), which has separately been associated with improvement in underlying psychopathology. We examined the literature through April 2024 to assess if short-term MBIs, defined as 8 weeks or less, could result in similar changes within WM. 3 studies met criteria for inclusion. Kral et al demonstrated that mindfulness-based stress reduction (MBSR) for 8-weeks resulted in an increase in resting-state functional connectivity (rsFC) between the dorsolateral prefrontal cortex (DLPFC) and posterior cingulate cortex but no changes in FA. Patsenko et al found an increase in rsFC between the DLPFC and inferior parietal cortex but no changes in FA after 2 weeks of mindfulness through video games. Mioduszewski et al found an increase in FA after 8 weeks of MBSR within the left subcortical region and sagittal striatum. Our study demonstrates that short-term MBIs might primarily result in changes within the connectivity of the brain, whereas longer practices might result more so in changes within the structure of WM. More studies are required to corroborate our conclusions.

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Funding: None

Keywords: Mindfulness-Based Interventions (MBIs), Mindfulness, Diffusion Tensor Imaging (DTI), White Matter, Resting-State Functional Connectivity (RSFC)

Leslie E

Delusional distress is associated with global emotion dysregulation in schizophrenia-spectrum disorders

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The distressing nature of delusional beliefs is considered key to their persistence. One potential mechanism underlying delusional distress is global emotion dysregulation. Global emotion dysregulation is associated with general psychotic symptom severity, but its specific relationship to delusional distress has yet to be closely examined.

People with ($n = 54$) and without ($n = 52$) schizophrenia-spectrum disorders completed measures of delusional ideation (PDI-21) and global emotion dysregulation (DERS-16). Participants with schizophrenia also completed a measure of delusion severity (PSYRATS). We analyzed relationships between dimensions of delusions and global emotion dysregulation using nonparametric partial correlations.

Delusional ideation and global emotion dysregulation were significantly elevated in those with schizophrenia compared to controls ($p < .001$). Global emotion dysregulation was significantly associated with delusional distress on the PDI-21 ($p < .001$) and PSYRATS ($p = .015$). A tendency to have negative reactions to one's own emotions (non-acceptance) and limited access to emotion regulation strategies were significantly associated with delusional distress on both scales ($p < .01$). After controlling for preoccupation, only limited access to emotion regulation strategies remained significantly correlated with delusional distress ($p = .0007$).

Emotion dysregulation, particularly the sense that there is little one can do to regulate themselves when upset, relates to delusional distress.

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Funding: NIMH K23MH126313

Keywords: global emotion dysregulation, schizophrenia-spectrum disorders, delusions, distress

Kittleson AR

Insula subregional volumes in early psychosis: A 2-year follow-up study

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Insular cortex is a heterogeneous region with cytoarchitecturally distinct subregions that govern interoception and may give rise to perceptual aberrations. Previous cross-sectional studies have shown smaller subregional insula volumes in patients with psychotic disorders. However, longitudinal insula subregional trajectories in early psychosis (EP), and relationships between subregional volumes and perceptual aberrations, have not been previously examined. To these ends, 66 EP and 65 healthy control (HC) participants completed 2-4 visits over 2 years. T1-weighted images were processed for longitudinal voxel-based morphometric gray matter volume (GMV) analyses. At baseline, participants completed the Perceptual Aberrations Scale (PAS). Insula GMV was significantly lower in EP participants across all subregions (all $p \leq 0.001$) and PAS scores were significantly higher ($p < 0.001$) at baseline; however, there were no significant associations between PAS score and insula volume. Longitudinally, whole insula GMV significantly declined over time ($p < 0.001$) which was more pronounced in HC (group-by-time interaction: $p = 0.01$). There was no significant group-by-subregion or group-by-subregion-by-time interaction. We demonstrate that all insula subregions are smaller in early psychosis, and this volume difference is stable in the first 2 years of illness. Insula volumes are not associated with self-reported perceptual aberrations and do not appear to decrease over the first years of illness.

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Funding: NIMH grant R01-MH70560

Keywords: insula, perceptual aberrations, psychosis, structural neuroimaging, longitudinal

Reimann GE

Similarity Indices and Community Detection Within an Internalizing Symptoms Network

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Disorders marked by fear, distress, avoidance, and other internalizing features frequently co-occur and commonly comprise symptoms cutting across diagnostic boundaries. This overlap in symptoms has brought into question where the natural demarcation exists between disorders characterized by internalizing symptoms. We employed a network approach to mathematically model internalizing symptom-level data from six clinical questionnaires assessing depression, generalized anxiety disorder (GAD), social anxiety disorder, panic disorder, posttraumatic stress disorder (PTSD), and obsessive-compulsive disorder (OCD). In a community-based sample of young adults ($n=1,282$; 17-23 years) with varying psychological presentations, we constructed a Gaussian graphical model of overarching symptom structure, and within this network, explored data-driven communities and estimated proximity-based node-wise similarities among symptoms. Node-wise properties of GAD symptoms show closer conceptual similarity to depressive symptoms, but distinction from social anxiety and panic, as evidenced by common neighbors and Dijkstra's shortest path length metrics. Exploratory graph analyses identified five symptom communities with moderate modularity ($Q = 0.64$), reflecting GAD/depression, social anxiety, panic, PTSD, and OCD symptoms. Overall, findings support a distress dimension (GAD and depressive symptoms) but do not a fear-based dimension (social anxiety and panic). Additionally, results support the conceptualization of PTSD and OCD as distinct from the other internalizing disorders.

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Keywords: anxiety, depression, trauma, community detection, networks

Sloan AF

Belief Updating, Childhood Maltreatment, and Paranoia in Schizophrenia

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Exposure to childhood maltreatment—a risk factor for psychosis associated with paranoia—may impact one's beliefs about the world and how beliefs are updated. We hypothesized that increased exposure to childhood maltreatment is related to higher expectations of volatility, and that this is strongest for threat-related maltreatment. Belief updating was measured in 75 patients with schizophrenia and 76 controls using a 3-option probabilistic reversal learning (3PRL) task. Computational parameters of belief updating – including expectations of volatility (μ_0) – were estimated. The Childhood Trauma Questionnaire (CTQ) was used to assess cumulative maltreatment, threat, and deprivation exposure. Paranoia was measured using the Positive and Negative Syndrome Scale (PANSS) and the revised Green et al. Paranoid Thoughts Scale (R-GPTS). Greater exposure to childhood maltreatment is associated with higher prior expectations of volatility in the whole sample and in individuals with schizophrenia. This is specific to threat-related maltreatment, not deprivation, in schizophrenia. Paranoia is associated with exposure to maltreatment and volatility priors, but there was no significant indirect effect of volatility priors on the relationship between maltreatment and paranoia. Individuals with schizophrenia who were exposed to threatening experiences during childhood expect their environment to be more volatile, potentially facilitating aberrant belief updating and conferring risk for paranoia.

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Keywords: computational modeling; decision-making; deprivation; threat; volatility

Marlowe RM

Social Media Experiences, Coping Flexibility, and Depressive Symptoms in High-Risk Adolescents

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Social media is large part of the adolescent experience and is associated with mental health (Ivie et al., 2020). Emotional responses after use have been linked to depression in teens (Nesi et al., 2021). Coping flexibility is also linked to lower depressive symptoms (Kato, 2015). The present study investigates these relationships in a high-risk adolescent sample. We hypothesized higher positive and negative affect after social media use would be associated with higher depressive symptoms and this relationship will be moderated by coping flexibility. Adolescent psychiatric inpatients (N=103; ages 12-17; Mage = 14.28; 75.7% female; 59.2% white; 11.7% Hispanic; 49.5% sexual minorities; 15.5% gender diverse) completed surveys upon admission, including the Patient Health Questionnaire 9 (PHQ-9; Spitzer et al., 2001), Self-Perceived Flexible Coping Scale (SFCS; Zimmer-Gembeck et al., 2018), and Emotional Responses to Social Media Experiences (ERSME) scale (Nesi et al., 2021). Depressive symptoms were positively correlated with negative ERSME ($r=.43$, $p<.01$) and coping rigidity ($r=.24$, $p<.05$) and negatively correlated with positive ERSME ($r=-.22$, $p<.01$), multiple coping strategy use ($r=-.49$, $p<.01$), and situational coping ($r=-.24$, $p<.05$). Multiple coping strategy use and negative ERSME ($B=.501$; $t=4.246$, $p<.001$) predicted depressive symptoms in regression analyses. Coping flexibility did not moderate this relationship.

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Keywords: adolescents, social media, depression, affect, coping

Mayes J

Parents' Experiences in the Pediatric Emergency Department During their Child's Mental Health Emergency

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Utilization of emergency departments (ED) for psychiatric emergencies in adolescents is on the rise (Plemmons et al., 2017). While there are adolescent focused ED interventions to reduce risk after ED discharge (Asarnow et al., 2011), no evidence-based interventions exist to support parents of children seeking psychiatric emergency care. The present study aims to examine parent experiences in the pediatric ED setting during their child's psychiatric emergency to inform the development of parent-focused ED interventions. We interviewed N=13 parents within 1-month of their child's psychiatric ED visit. Semi-structured qualitative interviews probed their experiences leading to their child's ED visit, during their ED admission, and after discharge from the hospital. Themes fell into three broad categories: (1) impact of ED admission on their child, (2) the nature of interactions with the ED staff/hospital system, and (3) parents' attitudes toward, emotions in response to, and understanding of their child's mental health. Themes highlight strengths and weaknesses of psychiatric ED care, how interventions can be improved and parents' resiliency. Findings can inform improvements in our pediatric ED setting that may benefit families seeking psychiatric support, and point toward the importance of providing parents with support in addition to support for the child in crisis.

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Funding: Klingenstein Foundation Third Generation Fellowship

Keywords: Parents, Qualitative, Adolescents, Interventions, Emergency Departments

Sangimino M

Personal space regulation and self-disturbance in relation to social contexts in schizophrenia

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Interpersonal distance (IPD) refers to the social comfort space around the self. During social interactions, IPD is contextually adjusted, increasing under threat and decreasing during friendly interactions. Thus, personal space regulation is highly relevant for psychiatric disorders especially schizophrenia (SZ). SZ is associated enlarged IPD in general but the origins and consequences of disrupted IPD in this population have not been extensively examined. IPD was estimated with the Stop Distance Task in 19 SZ and 19 control participants (CO). Participants indicated preferred IPD for friendly or threatening avatars in immersive virtual reality (VR) in approach (active) or withdrawal (passive) conditions. For both groups, IPD for active condition was larger than that for passive condition. There were no groups differences in IPDs under threat, but SZ had a larger IPD than CO in the friendly condition. Agency modifies IPD as observed in the active condition. Under threat, there were no group differences in IPD, which suggests intact response to danger in SZ. However, enlarged IPDs of SZ in the friendly conditions may indicate an inability to flexibly regulate personal space in relation to social contexts.

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Funding: None

Keywords: Schizophrenia, Interpersonal Distance, Virtual Reality, Social, Positive Symptoms

Roeske MJ

Modulation of Hippocampal Hyperactivity in Schizophrenia With Levetiracetam: a Randomized, Double-Blind, Cross-Over, Placebo-Controlled Trial

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Previous neuroimaging studies of the fractional amplitude of low frequency fluctuations (fALFF) have demonstrated hippocampal hyperactivity in patients with schizophrenia. We hypothesized that levetiracetam (LEV), an anti-epileptic drug binding to the synaptic vesicle glycoprotein 2A, normalizes the hippocampal excitation/inhibition imbalance in persons with schizophrenia and can be measured using fALFF. Thirty healthy control participants and 30 patients with schizophrenia were randomly assigned to a double-blind, cross-over trial to receive a single administration of 500 mg oral LEV or placebo during two study visits. At each visit, we assessed resting state normalized fALFF. We used linear mixed models to test for group and treatment effects and a group-by-treatment interaction. Hippocampal fALFF was significantly elevated in patients with schizophrenia ($p = 0.004$). Hippocampal fALFF decreased in schizophrenia patients relative to healthy controls after LEV treatment, but the effect did not reach statistical significance ($p = 0.089$). We found a linear relationship of LEV treatment on hippocampal fALFF signal ($p = 0.003$), in which hippocampal fALFF was highest in patients after placebo treatment, lowest in control participants after placebo treatment, and intermediary in patients after LEV treatment. We found evidence for hippocampal excitation/inhibition imbalance and a normalizing effect of LEV in schizophrenia using fALFF. Additional studies, in early stage psychosis cohorts and with longer duration of LEV treatment, are needed to establish levetiracetam as a treatment for schizophrenia.

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Keywords: Hippocampus, Schizophrenia, Functional Neuroimaging, Clinical Trial, Levetiracetam

Lake AM

Genome-wide association study of short-term weight change following atypical antipsychotic exposure in a hospital population

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Atypical antipsychotics (ATAP) are instrumental in the treatment of schizophrenia & other psychiatric conditions yet are associated with adverse metabolic effects including weight gain. Pharmacogenomic testing holds promise for individualizing antipsychotic treatment to reduce risk of weight gain, yet previous genome-wide association studies (GWAS) are limited by small sample size and limited cross-disorder generalizability. We conducted a GWAS of short-term ATAP-induced weight gain (AIWG) in 628 European-ancestry adults receiving care at VUMC with available genotyping data, anthropometric data, and evidence of ATAP treatment. The most common psychiatric diagnoses represented were mood & anxiety disorders. GWAS revealed a single locus including 22 genome-wide significant SNPs in the 20 kB region surrounding the CDH13 transcription start site (lead SNP, rs12598679), including SNPs previously associated with adiponectin levels & cross-sectional BMI. Sensitivity analyses demonstrated that these associations were robust to adjusting for baseline BMI & excluding individuals undergoing weight loss. Forthcoming analyses will test for replicability of this association in multiple cohorts of adults and children of diverse genetic ancestries from both VUMC & external replication sites. This study contributes to the small but rapidly growing body of AIWG genetics research & has improved cross-disorder generalizability compared with prior studies. The GWAS implicates CDH13, a cadherin family gene that functions as a receptor for adiponectin & LDL cholesterol, has a demonstrated role in neurodevelopment, & has previously been implicated in several psychiatric conditions. Given its links to both metabolic & neuropsychiatric traits, CDH13 is a promising candidate for further investigation into its pharmacogenomic utility & mechanistic impact in both AIWG & neuropsychiatric traits.

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Keywords: Genetics, pharmacogenomics, antipsychotics, electronic health records, antipsychotic-induced weight gain

Broadbent CS

Development of an integrative group-based hypnosis and CBT protocol for adults with anxiety and co-occurring health conditions

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Adults with chronic pain are approximately five times more likely to report symptoms of anxiety or depression, and nearly 1 in 20 U.S. adults experience co-occurring chronic pain and clinically significant emotional distress. In managing chronic health conditions, untreated anxiety can heighten pain, increase susceptibility to stress-induced symptom flares, and worsen prognosis. Hypnosis displays strong research support as an effective treatment for chronic pain and is widely used in clinical settings for stress management. When combined with CBT, the standard treatment for anxiety disorders, hypnosis is even more efficacious than either treatment alone. To date, no formalized protocol exists to deliver CBT-informed hypnosis in a group setting to individuals with co-occurring chronic health conditions and anxiety. The purpose of this study was to develop an evidence-informed integrative hypnosis protocol to treat comorbid chronic health conditions and anxiety with patient input. Information from literature review and current best practices in the topic areas will be presented. We then describe efforts to integrate patient and provider input to inform protocol feasibility and acceptability. We will then present the final protocol structure and content which will be launched in a pilot investigation in late summer 2024.

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Funding: None

Keywords: hypnosis for anxiety, hypnosis for stress management, group-delivered hypnosis, cognitive behavioral therapy integration, program development

Baxter T

Embodiment of Loneliness and Self-Disturbances in the Schizophrenia-Spectrum

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Prevalence of loneliness among individuals with schizophrenia (SZ) is as high as 80% (Badcock et al., 2020). Further, there is substantial evidence that links loneliness with self-disturbance, and self-disturbance with disrupted embodiment. However, the direct relationship between loneliness and bodily self remains obscure. The aim of this study was to further elucidate how loneliness, social hallucinations, and self-disturbances might be manifested and experienced in SZ-spectrum conditions. Individuals with SZ and matched controls (assessed for psychosis risk) completed a novel visuospatial mapping task that required localizing bodily sensations associated with loneliness and self-disturbances; interoceptive awareness was also assessed. Results indicate loneliness is linked with increased self-disturbance and also that self-disturbance is linked with disrupted embodiment, which is consistent with previous work. However, results also demonstrate that experience of the bodily self is different between SZ and CO, regardless of loneliness. This research highlights the importance of including participants' perspectives and qualitative measures in research, particularly among populations with schizophrenia-spectrum conditions.

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Keywords: Schizophrenia, Loneliness, Embodiment, Self-Disturbance, Qualitative Research

Blyth SH

Adolescent Substance Use is Associated with Resting-State Network Connectivity, Psychiatric Symptoms, and Cognitive Performance

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Over 50% of adolescents report substance use, associated with mental illness and cognitive impairment. Underlying pathophysiology remains unknown, and treatments are limited. We sought to identify circuitry associated with adolescent substance use, psychiatric symptoms, and cognition. Using data from the Philadelphia Neurocognitive Cohort ($n=9,498$; ages 8-21), we calculated functional connectivity (FC) between the Default Mode Network (DMN), Executive Control Network (ECN), and Salience Network (SN) in 521 participants. Cocaine use was associated with depression ($b=0.62$), PTSD ($b=0.76$), ODD ($b=0.59$), and conduct disorder ($b=1.22$) (all $p<0.05$). Marijuana use was associated with ADHD ($X^2=3.92$), and OTC medication misuse was associated with psychosis ($X^2=4.65$) and social anxiety ($X^2=4.55$) (all $p<0.05$). DMN-ECN connectivity was related to use of cocaine ($b=0.24$), opioids ($b=0.42$), and OTC medications ($b=0.28$), depression ($b=-0.26$), and verbal reasoning ($b=-0.10$) and working memory ($b=-0.10$) (all $p<0.05$). DMN-SN connectivity was associated with depression ($b=-0.39$), executive accuracy ($b=-0.07$) and attention ($b=-0.08$) (all $p<0.05$). Within-DMN connectivity was associated with ODD ($b=0.21$) and attention ($b=0.06$) (all $p<0.05$). Verbal reasoning mediated the relationship between cocaine use and DMN-ECN connectivity (ACME= -0.0259 , $p<0.05$). Adolescent substance use is associated with disturbed FC and cognitive performance. Impaired network FC could be an intervention target for substance use and cognitive impairment.

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Keywords: Adolescence; substance use; network functional connectivity; cognitive impairment; psychiatric symptoms

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Unique Barriers in the Creation and Maintenance of Pro-Bono Asylum Clinics in Southeastern US

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Student-run asylum clinics (SRACs) provide pro-bono psychiatric evaluations for asylum seekers yet face significant barriers to establishment and sustainability. The unique cultural identity of the United States (US) Southeast, shaped by historical and social factors, presents additional challenges. This study aims to identify and address the specific obstacles encountered by SRACs in the US Southeast region. An IRB-approved online survey was distributed to US SRACs recording responses on 7 categories of barriers in clinical operations. Responses were evaluated on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree," with descriptive statistics utilized for analysis. Of the 14 surveys sent, 7 clinics responded (response rate 50%). Respondents represented various US regions: Southeast (3, 43%), Northeast (2, 29%), Southwest (1, 14%), and Midwest (1, 14%). Significant challenges related to the political climate and legal repercussions were reported by 28.6% of institutions, all of which were located in the Southeast. Additionally, 66.7% of clinics reported transportation barriers faced by asylum seekers, with half of these respondents located in the Southeast. Findings highlight the impact of regional political climate and transportation accessibility on clinic operations. Future research will involve further survey distribution to SRACs to gain additional insights into regional barrier characteristics.

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Funding: Health Equity Innovation Award, VUMC Office of Health Equity

Keywords: Student-run free clinic, Asylum clinic, trauma, refugee, asylum seeker

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Peer-led Review Session Increases Confidence and Improves Preparedness for Psychiatry Clerkship NBME Shelf Exam

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Background: Vanderbilt University School of Medicine (VUSM) medical students undergo a fast-paced 4-week psychiatry clerkship where students are expected to have a full fund of psychiatry knowledge for the National Board Medical Examiner (NBME) shelf exam. To fill “test-taking” knowledge gaps, a psychiatry review session was implemented in November 2022. This study aims to evaluate whether this review session improves exam scores and students’ self-assessed preparedness for the exam.

Methods: Students’ self-assessed preparedness for the psychiatry shelf exam (1=not prepared, 5 = very prepared) on pre- and post-review session surveys will be compared. De-identified shelf scores will be compared before/after review session implementation. **Results:** While students felt significantly more prepared for the exam after the review session compared to before, but there was no improvement in shelf exam scores after the review session was implemented in 2022.

Conclusion: Although review sessions may not lead to higher overall scores on shelf exams, students consistently report that these sessions enhance their feelings of preparedness and potentially reduce stress and anxiety surrounding the exam.

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Funding: None

Keywords: Medical Education, Quality Improvement, Clerkship, Curriculum

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Investigating The Need for Pediatric Forensic Evaluations Among Medical-Student Run Asylum Clinics

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Psychiatric evaluations that document trauma significantly increase asylum approval rates for refugees by 40-90%. In 2023, the U.S. Unaccompanied Children Program received 118,938 referrals for the care of children seeking refuge. Meanwhile, there are 47+ medical schools with organizations that provide psychiatric evaluations for asylum seeking individuals. This study investigates the services provided to children by student-run asylum clinics. An IRB-approved survey was sent to U.S. medical schools with asylum clinics. Organizations were asked if they have noticed a need for pediatric forensic evaluations and barriers encountered when attempting to provide such evaluations. Descriptive statistics were used to analyze the data. Preliminary results from 11 responses revealed the following: 36.4% (n=4) responded "yes" to noticing a need for pediatric forensic evaluations; 36.4% (n=4) responded "yes" to receiving referrals to perform pediatric psychiatric evaluations; 36.4% (n=4) indicated that they had not considered performing pediatric evaluations; 45.5% (n=5) indicated that a barrier to providing forensic evaluations to children was a limited number of specialized physicians. There is likely an unmet need for pediatric psychiatric evaluations in the U.S. A barrier to performing pediatric evaluations is a limited number of physicians specialized in this field. Continued data collection is warranted.

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Keywords: asylum, refugee, psychiatry, pediatric, evaluation

Layne A

Frequency and Relevance of Substance Use Information in Forensic Mental Health Evaluations: An Exploratory Study of Probative (vs. Prejudicial) Value

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Forensic evaluators address psycholegal questions for the court (e.g., a defendant's competence to proceed and/or mental state at the time of an alleged offense). Some have questioned whether potentially prejudicial information, such as criminal history, race, and/or substance use history, should be included in reports (e.g., Gardner et al., 2023). This exploratory study examined the frequency and extent to which substance use information is included in forensic mental health evaluations, and its relevance to the ultimate opinion(s).

Reports were randomly selected from court-ordered referrals to the Vanderbilt Forensic Evaluation Team made in 2019, stratified by month (N = 110). Substance use history was detailed in 69% of reports. Nearly 75% of the sample was diagnosed with a substance use disorder (SUD); and 10% with a substance-induced disorder. However, this information was explicitly related to competency and insanity opinions only 6.4% and 10% of the time, respectively. Despite this, the authors argue that this information is relevant to providing a comprehensive clinical picture of defendants and making meaningful recommendations to the Courts regarding diversion and/or treatment resources. Future research will explore state policies regarding inclusion of substance use information and survey evaluators about their decision-making processes.

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Funding: None

Keywords: Competency, Insanity, Substance Use, Forensic Evaluations

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Converting Weakness into Strength: Rapid Resolution of Functional Neurological Symptom Disorder with Intravenous Lorazepam

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Functional neurological symptom disorder (FNSD) is a debilitating condition with high incidence and healthcare costs, with charges for ED and inpatient care estimated to be over \$1.2 billion per year. The mainstay of treatment to date has included psychoeducation, psychotherapy, and physical therapy, but symptomatic improvement is variable and can take weeks to months. Here we present a case report with rapid resolution of FNSD about an hour after IV lorazepam administration, suggesting that lorazepam may be a promising agent in the treatment of FNSD worth investigating further.

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Funding: None

Keywords: Functional Neurological Symptom Disorder; Lorazepam; Neuropsychiatry; Emergency Psychiatry; Consult-Liaison Psychiatry

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Investigating Interactions Between the Circadian and Reproductive Systems in Female Reproduction

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Around 1 in 6 women aged 15-49 experience infertility in the United States. Numerous studies reveal that reductions in female reproductive health arise, in part, from circadian disruption. Reproductive function is controlled by the hypothalamic-pituitary-gonadal (HPG) axis. Gonadotropin-releasing hormone (GnRH) neurons in the hypothalamus release GnRH and stimulate secretion of gonadotropins from the anterior pituitary, which ultimately stimulates gametogenesis and steroidogenesis in the ovaries. The suprachiasmatic nucleus (SCN) serves as the master clock to generate circadian rhythms. The SCN is a neurochemically heterogeneous nucleus with vasoactive intestinal polypeptide (VIP)-expressing neurons in the ventral SCN being crucial for female reproductive function. This project sought to determine whether SCN VIP cells project monosynaptically to major inhibitory and stimulatory systems that lie upstream of GnRH neurons, RFamide-related peptide-3 (RFRP-3) neurons in the dorsomedial hypothalamus (DMH) and kisspeptin (Kp) neurons in the anteroventral periventricular nucleus (AVPV), respectively. Cre-dependent, viral retrograde tract tracing in transgenic mice in which Cre-recombinase is driven by the Kiss1 promoter was used to explore this question. Although projections from SCN to AVPV Kp cells were not identified, AVPV Kp cells were found to receive monosynaptic input from numerous brain areas, including the lateral septum, medial preoptic area, cingulate cortex, paraventricular nucleus, dorsomedial hypothalamus, and arcuate nucleus. This finding suggests that Kp cells act as an integration site for a host of variables regulating reproduction.

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Keywords: Female Reproduction, Circadian Rhythm, Kisspeptin, Suprachiasmatic Nucleus, Retrograde Tracing

Wimbiscus M

Profiles and Management of Hand Injuries in Psychiatric Patients: a Case Series

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Injuries to the upper extremity can be physically devastating and have significant psychological and sociological sequelae. Management of these injuries becomes more complicated in the context of patients with chronic or acute psychiatric comorbidities. These conditions significantly affect the ability of medical professionals to provide optimal care throughout the course of their treatment (PMID 31763081). It is important to understand the profiles of such patients to better customize treatment regimens for a vulnerable population. In this case series, the medical records of seven patients with hand injuries and major psychiatric comorbidities at Vanderbilt University Medical Center were analyzed. Patient demographics, details of injury, subsequent medical care including complications and challenges associated with mental health status are recorded and discussed. Among the seven patients aged 20 to 70, several themes emerged. These patients had difficulty maintaining medical restrictions and often did not attend scheduled medical or therapy appointments. The available medications for treatment were often limited by the history of OUD. Patients were often insured via public insurance or uninsured altogether. Understanding the barriers that these patients face will better equip the treatment team to create successful individualized treatment plans.

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Funding: None

Keywords: Hand Injuries, Physical Therapy, Therapy Complications, Psychiatric Complications

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Comparing Characteristics Self-Inflicted Gunshot injuries and Assault Gunshot Injuries

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The gun violence epidemic continues to ravage the United States. In 2018, 39,740 were killed by gun violence, roughly half of which were suicides¹. In 2015, the rate of US deaths from gun violence were 11.2x that of other high income countries². Gunshot Wounds (GSWs) to the face are of special concern to plastic and reconstructive surgeons. A study by Demetriades et al (1998) found that 6% of gunshot wounds in a tertiary care center involved the face. GSWs can be divided into Self inflicted (SIGSWs) and those secondary to assault. There remains a paucity of literature comparing GSWs secondary to violence to SIGSWs. There are no clear principles comparing management of the two, and management is often surgeon and institution-dependent. This study hopes to elucidate the difference between SIGSW and GSWs secondary to assault to tailor future surgical management.

The medical records of 472 patients with GSWs to the head from a level 1 trauma center in Nashville, TN were analyzed. Patients' ages ranged from 2.1 to 89.6 (mean of 33.7). Patient related comorbidities, psychiatric history, insurance types, and surgical reconstruction characteristics were recorded.

Patients with SIGSWs are an understudied population. Our study suggests that a larger proportion of GSWs at a tertiary care center are self-inflicted than suspected. The most common conditions that predate a SIGSW are depression, anxiety, and substance use disorders. The patients were disproportionately on medicare and medicaid. Better understanding their demographics from a psychiatric stance will help psychiatrists to understand which patients are at risk, and for plastic surgeons to better prepare for repair of such injuries.

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Funding: None

Keywords: SIGSW, Psychiatric Comorbidities,

Cassidy RM

Kava Withdrawal and Kava Use Disorder

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Background: Kava consumption is a traditional practice in Polynesian and Micronesian cultures. It has recently gained popularity in the U.S. for therapeutic and recreational use.

Methods: We report the following case report and result of a systematic review identifying prior publications on the topic of kava withdrawal.

Results: An adult male presented to the emergency department after a fall while intoxicated on kava. He was medically admitted for altered mental status, a facial fracture, and hyponatremia. Psychiatry was consulted for management of delirium. On interview, he reported consuming escalating amounts of kava for weeks despite attempts to stop. He was diagnosed with acute kava withdrawal with hyperactive delirium, treated with phenobarbital load (860mg) and taper (390mg). Continuous dexmedetomidine drip to hospital day 3 treated sympathetic activation and breakthrough agitation. By day 4, his delirium resolved and remained in remission until discharge. We performed a systematic review for reports of kava withdrawal, returning 9 studies. Eight assessed withdrawal symptoms after cessation of a low controlled dose of kava extract with no symptoms noted. One reported a case series of heavy kava users with seizure-like events. No publications discussed treatment of kava withdrawal.

Conclusion: To our knowledge, this is the first publication to describe kava withdrawal syndrome and its effective treatment with phenobarbital.

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Funding: None

Keywords: kava, withdrawal

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The Cultural Context of Psilocybin

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Background: Psilocybin-assisted psychotherapy is a treatment modality that is accumulating evidence for efficacy in psychiatric disorders. Although relatively new to Western psychiatry, psilocybin is a substance that has been used in healing rituals for centuries by the indigenous peoples of Mesoamerica and which holds high cultural significance for these peoples. The cultural context from which psilocybin originated is vastly different than that of Western psychiatry. Thus, it is important to understand the history of this substance.

Methods: I searched the literature for articles discussing the history and cultural context of psilocybin, primarily drawing from articles in ethnography.

Results: There are clear records dating back to at least the 16th century which establish the religious and cultural significance of psilocybin to the indigenous peoples of Mesoamerica. Western colonization of Mesoamerica brought religious persecution of the people that participated in psilocybin rituals. Psilocybin rituals are still practiced in Mesoamerica and contain much greater explicit emphasis on religion and community than Western medicalized usage of psilocybin.

Conclusions: It is important for psychiatry to be mindful of the cultural context of psilocybin given that this substance holds religious and cultural import for the peoples amongst whom it originated.

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Keywords: psilocybin, culture

Allen-Slaba N

Examining The Effects of Adjunctive Medications with ECT

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Electroconvulsive therapy (ECT) is an effective treatment for a wide variety of psychiatric disorders, and is most commonly used to treat major depressive disorder (MDD). Much literature has explored how commonly prescribed medications can interfere with or supplement ECT. The purpose of this brief presentation is to highlight the common psychiatric medications that are often used in conjunction with ECT, with an emphasis on those that have been shown to be synergistic with ECT. By reviewing some common medication classes that are almost always prescribed while a patient undergoes a course of ECT (SSRIs/SNRIs, TCAs, MAOIs, and Lithium), this presentation will provide a concise review of the current literature surrounding their adjunctive effects.

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Keywords: ECT Depression Medications SSRIs Lithium

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Automated Discovery of the Root Causes of Disease

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The root causes of disease intuitively correspond to the initial changes to a biological process that induce a diagnosis as a downstream effect. We mathematically formalize this intuition in order to automate the discovery of root causes of disease from data using computer algorithms. We then introduce multiple algorithms that discover root causes of disease and estimate their causal effects without the need for a randomized controlled trial. Finally, we highlight recent work in the identification of drug targets using root causal genes, or the initial gene expression levels perturbed in disease.

RESEARCH AWARD WINNER AY24

The Research Award recognizes research conducted by a resident or fellow during training in the Department of Psychiatry and Behavioral Sciences and mentored by a Vanderbilt faculty member

Eric V Strobl, MD, PhD

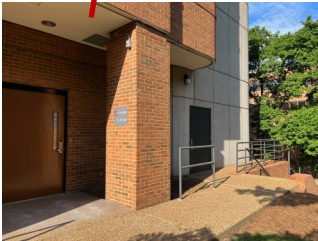
Fellow, Child and Adolescent Psychiatry

Additional Authors: None

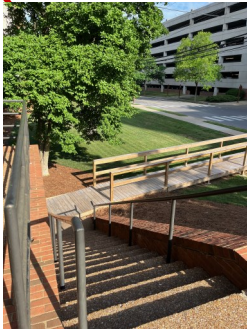
Funding: None

Keywords: causal discovery; causal inference; root causes; genomic medicine; computational genomics

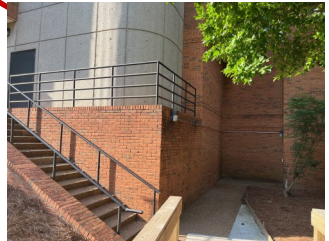
Navigating Academic Psychiatry Day



Conference Center Door
(Oral Sessions)



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Make your way to
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You can access the VPH Conference Center from the outside door or through controlled access doors from inside VPH (for employees with swipe access)

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