



**DART 2020**

**Summer Research Day**

**Friday, July 31<sup>st</sup> 2020**

**VIRTUAL SCIENTIFIC MEETING GUIDE**

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## VIRTUAL MEETING INFO

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# GENERAL SCHEDULE

Friday, July 31, 2020

10:30 a.m. – 12:30 p.m.    ||    Live, Virtual Poster Presentations

2:00 p.m. – 3:00 p.m.        ||    Keynote Speech

## KEYNOTE SPEAKER



**Denise Hien, Ph.D.**  
*Rutgers University*



**Friday, July 31, 2020**  
**2:00 PM EDT – 3:00 PM EDT**

*At the Crossroads: What We Know  
About Treating Traumatic Stress and  
Addictions*

Denise Hien, PhD, ABPP is Professor and Director of the Center of Alcohol & Substance Use Studies at Rutgers University-New Brunswick. She also serves as the Associate Dean of Academic Affairs in the Graduate School of Applied and Professional Psychology at Rutgers. Dr. Hien and her team have conducted programmatic research on substance use disorders, trauma, and women's health with continuous funding from the National Institute on Drug Abuse (NIDA) and the National Institute on Alcoholism and Alcohol Abuse (NIAAA) for over 20 years. In addition, she directs a NIDA-sponsored R25 training program for translational addiction research for racial/ethnic minority students. Dr. Hien is board-certified in clinical psychology (ABPP) and has served as a standing member on NIDA's NIH Institutional Review Groups and a health disparities advisory group to the Director on Asian/Pacific Islander issues.

# POSTER PRESENTATIONS

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**#1 || Pharmacological Interventions for Stress-Induced Relapse: Efficacy Across Sex and Species**

Presented by Erin Martin, BA  
Graduate student from the Medical University of South Carolina  
Mentored by Aimee McRae-Clark, PharmD  
Abstract Page 7



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**#2 || Gender differences in motivations for cannabis use: An analysis from the Inventory of Drug Taking Situations**

Presented by Margaret Zielinski, BA  
Undergraduate student from Westmont College  
Mentored by Aimee McRae-Clark, PharmD  
Abstract Page 7



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**#3 || Neural reactivity in response to alcohol and trauma cues with depression severity as a moderator in patients with comorbid alcohol use disorder and posttraumatic stress disorder**

Presented by Zahraa Atoui, MD  
Medical student from the American University of Beirut, Lebanon  
Mentored by Amber Jarnecke, PhD  
Abstract Page 8



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**#4 || Combining Transcutaneous Auricular Vagus Nerve Stimulation (taVNS) with Transcranial Magnetic Stimulation (TMS) to Enhance Cortical Excitability**

Presented by Alex Kahn, BS  
Undergraduate student from the University of Florida  
Mentored by Bashar Badran, PhD  
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**#5 || The Relationship Between Oxytocin and Coping Skills on Conflict Resolution in Couples**

Presented by Aileen Kangavary  
Undergraduate student from California State University Northridge  
Mentored by Elizabeth Santa Ana, PhD & Julianne Flanagan, PhD  
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**#6 || Co-morbidity of PTSD and AUD: Using an Animal Model of the Single Prolonged Stress to Examine Stress-induced Reinstatement of Alcohol-Seeking Behavior**

Presented by Logan Manusky, BS  
Undergraduate student from the College of Charleston  
Mentored by Howard Becker, PhD & Marcelo Lopez, PhD  
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**#7 || Demographic Predictors of Engagement with a Technology-based Treatment for Depression Among Monolingual Spanish Speakers**

Presented by Brianna Polyak, MS  
Medical student from the University of Texas Rio Grande Valley School of Medicine  
Mentored by Jennifer Dahne, PhD  
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**#8 || Sex Differences in Glutamate Pathologies: Implications in Ketamine Treatment for Depression and Alcohol Use Disorder**

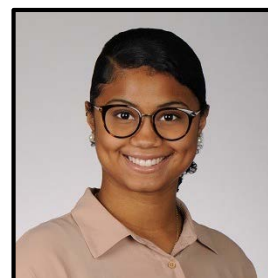
Presented by Hollis Chillura  
Undergraduate student from the University of South Carolina  
Mentored by Jennifer Jones, MD  
Abstract Page 10



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**#9 || Does Medication Reduce Alcohol Experimentation in Preadolescents with Attention-Deficit/Hyperactivity Disorder?**

Presented by Briana Hunt  
Undergraduate student from the College of Charleston  
Mentored by Lindsay Squeglia, PhD & Brittany Bryant, DSW, LISW-CP  
Abstract Page 11



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**#10 || Characterizing vaping behavior among current smokers introduced to e-cigarettes**

Presented by Larry Chen  
Undergraduate student from Indiana University Bloomington  
Mentored by Tracy Smith, PhD  
Abstract Page 11



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**#11 || The Association of Sleep Quality and Asthma Among Rural Adolescents**

Presented by Joy Gullo, BS

Medical student from the University of Connecticut School of Medicine

Mentored by Phillippe Cunningham, PhD

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**#12 || Cocaine and memory: The cell type-specific role of NPAS4 in the mouse nucleus accumbens**

Presented by Emily Karpf, BS

Recent graduate from Penn State University

Mentored by Rachel Penrod-Martin, PhD

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**#13 || Severity of Cannabis Use Disorder and Perceived Problems in Adolescents with and without Depression or Anxiety**

Presented by Jenny Nankoua

Undergraduate student from the College of Charleston

Mentored by Rachel Tomko, PhD

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**#14 || Impact of a Wellbeing Intervention on Physical Activity Among Early Childhood Education Teachers**

Presented by Isabella Dubrow, BS

Undergraduate student from the College of Charleston

Mentored by Angela Moreland, PhD & Nada Goodrum, PhD

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# ABSTRACTS

## POSTER #1

### Pharmacological Interventions for Stress-Induced Relapse: Efficacy Across Sex and Species

Erin L. Martin, BA, Elizabeth M. Doncheck, PhD, Carmela M. Reichel, PhD & Aimee L. McRae-Clark, PharmD

Drug addiction is characterized by bouts of relapse, and this relapse is often provoked by stressful experiences. While this sequence of events is well-described, there remains a lack of pharmacological interventions that can effectively disrupt this pattern. This can partially be attributed to a failure to translate positive findings from preclinical research through the human laboratory and to clinical trials. A critical component of this failed translation is inattention to sex as a biological variable, particularly prior to clinical trial enrollment. Here, we focus on pharmacotherapeutic targets assayed in the prevention stress-induced relapse-like behavior in both human and animal models, emphasizing the influence of biological sex on outcomes. The majority of targets that showed efficacy in rodents failed to do so in human models. Approaches that demonstrate at least some evidence of translational success include noradrenergic treatments (namely  $\alpha_2$  agonists, e.g. clonidine, lofexidine), neuroactive peptides (oxytocin), and cannabinoids (cannabidiol, FAAH inhibitors). Sex differences were observed for nearly all approaches that assessed an adequate sample of females, including those that were translationally successful. However, many articles still failed to consider sex as a covariate when conducting analyses of pharmacotherapeutic efficacy. This review underlines a clear need to critically evaluate preclinical and human laboratory models of stress-induced drug seeking for factors that contribute to failed translationally efficacy, and posits biological sex as foremost among these. Further, we encourage additional research effort into those pharmacotherapeutic targets capable of reducing stress-induced drug seeking in both men and women.

## POSTER #2

### Gender Differences in Motivations for Cannabis Use: An Analysis from the Inventory of Drug Taking Situations

Margaret Zielinski, BA & Aimee McRae-Clark, PharmD

**Background:** There is growing evidence of sex differences in cannabis use; for example, women have a faster temporal progression from first use to disorder and more severe withdrawal symptoms compared to men. There is a critical need to investigate why these differences occur. The purpose of this study was to determine if non-treatment seeking men and women with cannabis use disorder report using cannabis in different situations, have differences in adverse childhood experiences, and report differences in perceived stress. We hypothesized that women would report more use in negative situations compared to men, while men would report use in positive situations more than women. We also hypothesized women would have more adverse childhood experiences than men and greater perceived stress. **Methods:** A total of 105 adults (27 women, *M* age = 25.84 years) who met DSM-5 diagnostic criteria for cannabis use disorder (CUD) were enrolled in an ongoing study investigating the impact of progesterone on stress-related cannabis craving. Participants completed the Inventory of Drug Taking Situations (IDTS), Perceived Stress Scales (PSS), and Adverse Childhood Effects (ACE) surveys. **Results:** MANOVA's showed women significantly used cannabis for Unpleasant Emotions ( $p < 0.005$ ) and Physical Discomfort ( $p < 0.05$ ) compared to men. In addition, women had significantly higher ACE scores compared to men ( $p < 0.05$ ). However, there was no significant difference between males and females for PSS ( $p = ns$ ). **Conclusions:** These findings suggest that women use cannabis in response to negative situations more often than men. Women were also more likely to report adverse childhood experiences. However, men and women had similar levels of perceived stress. This suggests that interventions focused on managing negative responding may be more effective for women with CUD. Limitations include a small sample size and the unequal number of men and women in the study.



### POSTER #3

#### **Neural Reactivity in Response to Alcohol and Trauma Cues with Depression Severity as a Moderator in Patients with Comorbid Alcohol Use Disorder and Posttraumatic Stress Disorder**

Zahraa Atoui, MD, Amber M. Jarnecke, PhD, Jane E. Joseph, PhD, Laura Lohnes, BA, Kevin Gray, MD, Elizabeth Santa Ana, PhD, & Sudie E. Back, PhD

**Background:** Patients with comorbid alcohol use disorder (AUD) and posttraumatic stress disorder (PTSD) experience severe impairments and are at increased risk for depressive symptomatology. The reward pathway, represented by dopaminergic projections from the ventral tegmental area to the nucleus accumbens (NAc), contains circuitry implicated in both AUD and PTSD. However, little is known about the neurobiological mechanisms underlying comorbid AUD/PTSD, and how neural circuits implicated in this comorbidity might be modulated by depression severity. The current study uses functional magnetic resonance imaging (fMRI) to examine blood-oxygen level dependent (BOLD) signal among individuals with AUD/PTSD while accounting for sex and depression severity. **Methods:** AUD/PTSD participants (N=24) were enrolled in a larger clinical trial. Participants listened to personalized imagery scripts (trauma, alcohol, and neutral cues) during a baseline fMRI scan. General linear modeling characterized BOLD signal. Main effects for the group were modeled, as were effects for sex, depression severity, and the interaction of sex by depression severity. **Results:** In the alcohol versus neutral cue contrast, significant activation was found in bilateral inferior frontal gyrus (IFC) ( $Z=3.1$ ,  $p<.05$ ). In the trauma versus neutral cue contrast, significant activation was found in the middle and superior temporal gyrus ( $Z=3.1$ ,  $p<.05$ ). There were no effects for sex, depression severity, or sex by depression severity in either contrast. **Conclusion:** Contrary to hypotheses, findings suggest that depression severity is not associated with a difference in NAc activity among individuals with AUD/PTSD, whether responding to an alcohol or trauma cue. Among individuals with AUD/PTSD, IFC reactivity, a region involved in response inhibition and attentional control, might indicate an anticipatory effect during a salient alcohol cue. The middle/superior temporal gyrus, which may play a role in dissociative states in PTSD, shows increased activity during a trauma cue. These neural regions might be particularly relevant treatment targets for AUD/PTSD.

### POSTER #4

#### **Combining Transcutaneous Auricular Vagus Nerve Stimulation (taVNS) with Transcranial Magnetic Stimulation (TMS) to Enhance Cortical Excitability**

Alex T. Kahn, BS, Sean Thompson, BA, & Bashar W. Badran, PhD

**Background:** Neuromodulation techniques, such as transcranial magnetic stimulation (rTMS), are becoming widely used tools to augment motor training to facilitate motor function post-stroke. Primarily, rTMS is used to enhance cortical excitability. However, its effects are transient and behavioral benefits are mild in rehabilitation paradigms. There is a need for noninvasive neuromodulatory techniques that can induce robust changes in cortical excitability to facilitate motor recovery post-stroke and to enhance and accelerate neuroplastic changes induced by rTMS. Transcutaneous auricular vagus nerve stimulation (taVNS) has emerged as a promising facilitator of neuroplasticity, and in this trial, we explore combining two forms of brain stimulation (taVNS and rTMS) to boost cortical excitability. **Methods:** We will prescreen 40 healthy individuals with a single 20Hz rTMS session applied to the motor cortex flanked by pre- and post-MEP evaluations. From this prescreen cohort, we plan to enroll a total of 24 healthy participants (of whom had increases in motor excitability) into a 4-visit, randomized, sham-controlled trial exploring various forms of neuromodulation on cortical excitability. At the visits, we will conduct baseline measures of cortical excitability, using a validated motor evoked potential (MEP) paradigm, followed by 20 minutes of one of four different stimulation conditions (active TMS/sham taVNS, active taVNS/sham TMS, paired taVNS+TMS, or unpaired taVNS+TMS). MEPs will be recorded immediately after stimulation, and every 10 minutes for 30 minutes to analyze changes in excitability. **Results:** Although the study is still underway, we have one of subject who has completed all sessions for data analysis. In this subject, Active TMS/Sham taVNS condition induced a +114.9% increase in MEP amplitude compared to the baseline. Similarly, Active taVNS/Sham TMS condition induced a +82.4% increase in MEP amplitude compared to baseline (20 minutes post-stim). Both combinatory methods resulted in reductions in MEP



amplitude compared to baseline at the 20 minute timepoint (Paired taVNS+TMS: -73.4%, Unpaired taVNS+TMS: -70.7%). **Conclusions:** These preliminary results suggest that combining two forms of brain stimulation is safe, feasible, and likely impacts cortical excitability. These data suggest there may be an interaction between the two administered simultaneously, rather than independently. Further completion of the trial, along with increased sample size, and more rigorous statistical analysis is warranted to determine whether combinatory taVNS/TMS may be used as a cortical excitability tool.

## POSTER #5

### The Relationship Between Oxytocin and Coping Skills on Conflict Resolution in Couples

Aileen Kangavary, Elizabeth Santa Ana, PhD, Jeffrey Korte PhD, & Julianne C. Flanagan, PhD

**Background:** Oxytocin is a neuropeptide known for its anxiolytic, prosocial, and pair-bonding effects. However, the literature is mixed regarding how oxytocin affects human behavior depending on contextual and individual characteristics (i.e. sex, coping skills). While oxytocin might increase positive communication among normative couples, other literature reports that oxytocin might enhance detrimental behaviors such as competitiveness, aggression, and anxiety. The present study sought to address whether coping skills moderate the effect of oxytocin on a couples' laboratory-based conflict resolution behaviors compared to placebo. **Methods:** Participants were 30 different-sex couples (n=60) consisting of at least one partner with recent substance misuse. Participants were randomly assigned in a double-blind manner to 40 IU intranasal oxytocin or placebo. Couples completed the Brief COPE (Carver, 1997) and a 10-minute conflict resolution task. Conflict behaviors were observationally coded by independent rater's blind to drug condition. We hypothesized that: a) adaptive coping skills would increase the effects of oxytocin on frequency of Relationship Enhancing Attributions, and reduce the frequency of Distress Maintaining Attributions; and b) maladaptive coping skills would reduce the effects of oxytocin on frequency of Relationship Enhancing Attributions, and increase Distress Maintaining Attributions. **Results:** Among men, coping skills had no significant main effect on Relationship Enhancing or Distress Maintaining Attributions. However, oxytocin was more strongly associated with a decrease in Distress Maintaining Attributions among men with higher, compared to lower, maladaptive coping ( $p = .006$ ). For women, Distress Maintaining Attributions were reduced during the couples' task regardless of their coping behaviors. Additionally, oxytocin was more strongly associated with reduced Relationship Enhancing Attributions ( $p = .03$ ) among women with higher, as compared to lower, adaptive coping. **Conclusion:** Findings suggest that in this sample, women and men had differential responses to oxytocin administration which were influenced by their coping skills.

## POSTER #6

### Co-morbidity of PTSD and AUD: Using an Animal Model of the Single Prolonged Stress to Examine Stress-induced Reinstatement of Alcohol-Seeking Behavior

Logan Manusky, BS, Jessica Praigg, BS, Victoria Le, BS, Laura Ralston, BS, Howard Becker, PhD, & Marcelo Lopez, PhD

**Background:** Alcohol use disorder (AUD) is a chronic relapsing brain disease characterized by an impaired ability to control alcohol use. There is high co-morbidity of AUD and post-traumatic stress disorder (PTSD), and stress is one of the main triggers of relapse. Animal models have been developed to evaluate this issue that involve training rodents to press a lever to obtain alcohol, and acute stress exposure which induces reinstatement of alcohol-seeking behavior after a period of extinction training. This study aims to evaluate the effect of prior stress experience on alcohol-seeking behavior induced by acute stress. **Methods:** A single prolonged stress model (SPS) was used to induce trauma before acute stress was experienced to provoke alcohol seeking and drinking. Adult male and female C57BL/6J mice (24/sex) were trained to lever press for alcohol (ethanol 12% v/v) in operant conditioning chambers. Number of lever responses and alcohol intake were recorded to examine alcohol-seeking behavior. Once lever pressing and alcohol intake stabilized, half of the mice underwent SPS protocol (restraint, forced swim, and exposure to anesthesia). The day after SPS exposure mice resumed alcohol self-administration. **Results:** Initial baseline levels

of drinking remained constant after SPS exposure. Thus, prior SPS exposure did not affect immediate alcohol-seeking behavior. This study is still ongoing. **Conclusion:** The main hypothesis is that mice that experienced SPS will show higher levels of stress-induced (yohimbine) reinstatement in alcohol seeking and drinking after a period of extinction. If that is the case, this will allow the evaluation of therapeutic interventions to prevent relapse in a model of PTSD and stress-induced relapse. Previous studies have shown that oxytocin that has been utilized in the treatment of PTSD also attenuates stress-induced reinstatement of alcohol seeking in mice. Future studies could evaluate the effect of oxytocin or other drugs in this model of PTSD and alcohol relapse.

## POSTER #7

### Demographic Predictors of Engagement with a Technology-based Treatment for Depression Among Monolingual Spanish Speakers

Brianna Polyak, MS, Johanna Hidalgo, BS, & Jennifer Dahne, PhD

**Background:** Among Latinx adults with limited English proficiency (LEP), 27.3% report symptoms of depression, but only 22% of those symptomatic receive treatment. To extend treatment reach, recent studies have developed and evaluated mHealth depression treatments. Yet, predictors of mHealth treatment engagement are unclear. Examining treatment engagement predictors is important to identify subgroups most and least likely to benefit from an mHealth-based treatment and forms the basis for the present study. **Methods:** As part of a larger trial examining the efficacy of a mobile app for depression treatment (iAptivate!), present study data were collected from 22 participants that received iAptivate!. Demographic predictors included: gender, education, employment, income, relationship status, rurality, age, and symptoms of depression and anxiety. Treatment engagement metrics included: total app sessions, retention at weeks 4 and 8, and time using the app. Given the exploratory nature of this analysis, individual Chi-square and ANOVA analyses were used to examine associations between each demographic predictor and engagement metric. **Results:** Residents of more rural areas and older participants were more likely to engage with iAptivate! including frequency of app sessions ( $B = 0.64, p = 0.004$ ;  $B = 0.72, p = 0.00$ ); higher 4-week ( $B = 0.50, p = 0.04$ ;  $B = 0.49, p = 0.02$ ) and 8-week retention ( $B = 0.49, p = 0.04$ ;  $B = 0.66, p = 0.001$ ); and greater total time using the app ( $B = 0.65, p = 0.003$ ;  $B = 0.77, p = 0.00$ ). There was a trend toward significance where participants with greater anxiety at baseline had more sessions ( $B = 0.37, p = 0.09$ ) and higher 4-week retention ( $B = 0.39, p = 0.07$ ). **Conclusion:** iAptivate! potentially offers an alternative approach to reduce health disparities and provide evidence-based depression treatment for older Latinx adults with LEP who reside in more rural areas.

## POSTER #8

### Sex Differences in Glutamate Pathologies: Implications in Ketamine Treatment for Depression and Alcohol Use Disorder

Hollis Chillura & Jennifer Jones, MD

**Background:** Major depressive disorder (MDD) and alcohol use disorder (AUD) are prevalent psychiatric conditions that are known to occur at different rates between men and women. Furthermore, both MDD and AUD are associated with different treatment outcomes between the sexes. Both MDD and AUD have been associated with glutamatergic dysregulation. Ketamine, an N-methyl d-aspartate glutamate receptor (NMDAR) antagonist, has shown preliminary efficacy in the treatment of MDD and alcohol use disorder (AUD). Numerous studies have shown differences in the regulation of the glutamate system between men and women, which suggests that there may be sex-dependent differences in response to ketamine treatment. The purpose of this review is to summarize the current knowledge of sex-specific outcomes of ketamine treatment for MDD and AUD. **Methods:** A search was conducted using the Scopus database to identify completed human and animal studies discussing the effectiveness of ketamine in the treatment of MDD and AUD between 1 January 1971 to 1 June 2020. **Results:** The results of the pre-clinical literature search suggest that there are differences between male and female animals' behavioral outcomes of ketamine treatment for depression and alcohol use disorder. However, the few human trials that have examined sex as a moderator of depression treatment response with ketamine have not found significant sex-based differences. Additionally, previous clinical trials of ketamine treatment for alcohol use disorder did not examine the

sex-specific outcomes. **Conclusions:** While preclinical studies implicate sex as a moderator of treatment outcomes in MDD and AUD animal models, there have been few analyses in human trials of this potential confounder. Two of the three clinical trials have shown null findings, while one showed a small sex-based effect. Future studies should continue to evaluate sex-specific differences and should analyze the effects of female hormone levels on ketamine treatment outcomes.

## POSTER #9

### **Does Medication Reduce Alcohol Experimentation in Preadolescents with Attention-Deficit/Hyperactivity Disorder?**

Briana N. Hunt, Alexis M. Garcia, PhD, Brittany N. McKenzie, BS, Rachel L. Tomko, PhD, Brittany E. Bryant, DSW, & Lindsay M. Squeglia, PhD

**Background:** Attention-deficit/hyperactivity disorder (ADHD) is the most common neurodevelopmental disorder in youth. For preadolescents, medication and/or evidence-based behavioral interventions are strongly recommended for treatment of ADHD. Medication can help increase concentration and reduce impulsiveness, while behavioral treatments help parents and teachers manage problematic behaviors in the context in which they occur. Early interventions for ADHD are important, as untreated ADHD increases the likelihood of externalizing behaviors, including substance use. The aim of this study was to examine the differences in early alcohol experimentation in preadolescents who are medicated vs. non-medicated for ADHD. **Methods:** Baseline data from the Adolescent Brain Cognitive Development (ABCD) Study were used for analyses. The ABCD Study is the largest long-term study of brain development in the United States, consisting of 21 sites and approximately 12,000 youth. Youth (ages 9-10) were categorized as meeting criteria for ADHD if either: (1) they met criteria for current ADHD through parent-reported Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS) or (2) if the parent reported a previous ADHD diagnosis. Parents provided information on the child's current medications. Non-religious alcohol sipping behaviors were reported by youth. **Results:** Based on parent report, 2551 of the youth (21.5% of total sample; mean age= 9.48; 51.4% male) met criteria for ADHD, of which 221 children (8.6%) were medicated for ADHD. Within the medicated ADHD group, 14.5% of youth reported non-religious alcohol sipping, compared to 18.3% of the non-medicated ADHD group. After controlling for demographic variables (child age, sex, race, ethnicity, parent education, marital status), youth in the non-medicated ADHD group did not differ from the medicated group in terms of odds of non-religious sipping (OR= 1.29; 95% CI = .87 – 1.92). **Conclusions:** There were no significant differences in early alcohol experimentation between medicated and non-medicated youth with ADHD, though future research should examine older children for whom sipping may be more commonplace. Behavioral treatments for ADHD may be more helpful in reducing early alcohol use at this age.

## POSTER #10

### **Characterizing Vaping Behavior Among Current Smokers Introduced to E-cigarettes**

Larry Chen & Tracy Smith, PhD

**Background:** E-cigarette use (i.e., vaping) has risen in prevalence, and health experts agree that pose fewer risks than traditional cigarettes. However, we know relatively little about changes in e-cigarette use across time among current smokers who try e-cigarettes. The goal of this study was to utilize objective methods to characterize changes in e-cigarette use among current smokers who try e-cigarettes. Baseline predictors of use were also explored. **Methods:** Data were collected from current smokers with limited e-cigarette experience (n=26) participating in a larger study investigating the effects of e-cigarette device characteristics on reinforcement. At baseline, participants sampled an e-cigarette and completed a variety of e-cigarette reinforcement assessments. Participants then took the device home for three weeks, and the device recorded every e-cigarette puff, providing an objective assessment of use. Primary outcomes included the average number of puffs/day and the number of days used/week. **Results:** In

the last week of sampling, 85%, 42%, and 15% of participants used the e-cigarette on at least 1 day, 4 days, and 7 days, respectively. Across the sampling period, there was no significant change in average puffs/day ( $p > 0.05$ ) but there was a significant decrease in the number of days used/week ( $F(2,50) = 5.81, p < 0.05$ ). Baseline e-cigarette satisfaction and reinforcement predicted the numbers of puffs/day and number of days used in week 3 (Spearman's  $\rho$  all  $> 0.44, ps < 0.05$ ). **Conclusion:** On average, e-cigarette use frequency decreased across the sampling period. Baseline measures of e-cigarette satisfaction and reinforcement significantly predicted e-cigarette use at the end of sampling. However, there was wide variability in e-cigarette use frequency. A larger sample size and longer sampling period would allow for better characterization of use. Furthermore, this study may be reflective of only one type of e-cigarette; future studies should investigate other e-cigarette types.

## POSTER #11

### The Association of Sleep Quality and Asthma Among Rural Adolescents

Joy Gullo, BS, Cedasia McQueen, BA, Phillippe B. Cunningham, PhD, Cheng Shiun Leu, PhD,  
Stephanie Lovinsky-Desir, MD, Jean-Marie Bruzzese, PhD

**Background:** Asthma is a common chronic medical condition among U.S. adolescents. Studies have shown that rural adolescents compared to urban adolescents, suffer from increased asthma prevalence and morbidity, and are vulnerable to poor health outcomes due to limited access to medical care and financial constraints. The most underserved and marginalized communities in the United States are located in rural or non-metropolitan areas, which are mired in rising poverty, ethnic and racial inequality, and health disparities. Adequate sleep is essential for optimal health and development, which is often compromised among those with uncontrolled asthma, a major risk factor for poor sleep quality. The purpose of this study was to examine the association between uncontrolled asthma and sleep quality among nonmetropolitan and rural adolescents. We hypothesized that worse sleep quality will be associated with (1) being diagnosed with asthma, and (2) increased asthma severity. **Methods:** 1101 9th – 12th graders attending four rural public high schools in South Carolina completed a survey as part of a larger clinical trial testing the effectiveness of an evidence-based asthma intervention when delivered to rural adolescents with uncontrolled asthma. Students reported if they were ever diagnosed with asthma, and the frequency of asthma symptoms. Response were used to assess asthma severity based on NHLBI guidelines, asthma-related urgent care visits. Students were also asked five questions taken from the National Health and Nutrition Examination Survey (CDC, 2007) on sleep quality. Among participants (mean age =  $16.1 \pm 1.2$ ; 39.2% African-American, 32.2% White; 51.1% male), 35.3% reported sleeping less than eight hours during weekdays, 18.2% reported having trouble falling asleep often or almost always in the past month, and 22.8% reported feeling unrested during the day often or almost always in the past month. Adolescents diagnosed with asthma (11.3%,  $n=125$ ), 34% ( $n=42$ ) were characterized as having persistent asthma based on NHLBI standards. **Conclusion:** Future analyses will examine associations between sleep quality, asthma diagnosis, and increased asthma severity.

## POSTER #12

### Cocaine and memory: The Cell Type-Specific Role of NPAS4 in the Mouse Nucleus Accumbens

Emily Karpf, BS, Brandon W. Hughes, MS, Rachel Penrod-Martin, PhD, Makoto Taniguchi, PhD, &  
Christopher Cowan, PhD

**Background:** Drug seeking and relapse are driven, in part, by associations between the rewarding effects of drugs and the environment where the drug reward was experienced. Future exposure to this environment leads to an increase in drug-seeking behavior, which is partially driven by plasticity within the nucleus accumbens (NAc). The majority of neurons in the NAc are dopamine D1 or D2 receptor-expressing medium spiny neurons (MSNs), but the mechanisms mediating drug-context memories in these cell types is not well understood. We previously found that cocaine activates a sparse population of cells within the NAc that express the immediate early gene transcription factor, neuronal PAS domain 4 (NPAS4). NPAS4 has been shown to control the downstream expression of various

genes involved in cocaine-related memories. When NPAS4 is removed from the NAc, there is a significant reduction in cocaine conditioned place preference (CPP), suggesting that the animals have trouble associating the environment with the cocaine reward experience. Given this, we hypothesized that NPAS4 acts in a cell type-specific manner within the NAc to promote cocaine-conditioned learning and memory. **Experiment 1: Methods:** To identify cell types inducing NPAS4, transgenic mice expressing cell type-specific labels were exposed to a drug-paired environment, followed by IHC for NAc Npas4. **Results:** We found that ~50% of NPAS4-positive cells are D1R or D2R-expressing MSNs. **Experiment 2: Methods:** To determine which cell type requires NPAS4 for cocaine-reward associations, we reduced NPAS4 expression in D1- or D2-MSNs and performed cocaine CPP. **Results:** D2-NPAS4 knockout mice showed reduced CPP, indicating that NPAS4 expression within D2-MSNs is required for the development of cocaine CPP. **Conclusion:** Our findings are consistent with previous literature suggesting a role for activated D2-MSNs in decreased cocaine-reward learning, and NPAS4 seems to be a key player in dampening the activity of these neurons to promote cocaine-conditioned behaviors. Future studies are being conducted to investigate the mechanism of D2-MSN activation after Npas4 knockdown.

## POSTER #13

### Severity of Cannabis Use Disorder and Perceived Problems in Adolescents With and Without Depression or Anxiety

Jenny Nankoua, Jade Tuttle, BA, Erin McClure, PhD, Lindsay Squeglia, PhD, Kevin Gray, MD, & Rachel Tomko, PhD

**Background:** The complex relationship between youth cannabis use and mental health disorders such as depression and anxiety remains unclear. Youth may use cannabis to help alleviate depression or anxiety symptoms and this pattern of use may be associated with increased cannabis-related problems. The aim of this secondary analysis was to investigate if emerging adults with versus without a depressive or anxiety disorder who regularly use cannabis were more likely to meet diagnostic criteria for moderate or severe cannabis use disorder (CUD) versus mild or no CUD, report greater quantity/frequency of use, and self-perceive a problem with their usage. **Methods:** Emerging adults (18-21) who use cannabis  $\geq 3$  times weekly (N=42) tracked their cannabis use via mobile phone on a direct entry application for two weeks. At baseline, each participant was assessed for CUD, depression, and anxiety using a Diagnostic and Statistical Manual of Mental Disorders (DSM-5) structured interview and completed a questionnaire that measured cannabis problem recognition. **Results:** Twenty-six percent of participants met criteria for depression or anxiety. Participants who met diagnostic criteria for a depressive or anxiety disorder, compared to those who did not, were more likely to meet criteria for moderate or severe CUD ( $p=0.045$ ). There was not a significant difference in cannabis problem recognition scores ( $t= - 0.608, p=0.547$ ), number of cannabis use episodes ( $U=102, p=.284$ ), estimated grams of cannabis used ( $U=105, p=.332$ ), or amount of money spent on cannabis ( $U=84, p=.093$ ) between the two groups over two weeks. **Conclusion:** Cannabis users with depression or anxiety may be more likely than those without these disorders to meet criteria for moderate to severe CUD, despite not perceiving their use as more problematic. Differences in CUD severity cannot be explained by differences in quantity or frequency of use, suggesting that other factors contribute to increased CUD severity among individuals with depression or anxiety.

## POSTER #14

### Impact of a Wellbeing Intervention on Physical Activity Among Early Childhood Education Teachers

Isabella Dubrow, BS, Nada Goodrum, PhD, & Angela Moreland, PhD

**Background:** Physical activity is beneficial to overall wellbeing, and has been shown to reduce stress and improve mood (Paluska and Schwenk, 2012). The impacts of living a physically active lifestyle have led to individuals having a higher satisfactory quality for their own life (Peluso & de Andrade, 2005). Building wellbeing activities into the workplace enhances the attitudes and overall health of the individual workers (Chu et al., 2014). This study examines whether engaging in a wellbeing program increased early childhood education (ECE) teachers' physical activity. **Methods:** Be Well Care Well (BWCW) is a statewide ECE program designed to promote health and well-being of the

ECE teachers. Across South Carolina, 28 ECE centers voluntarily participated in this study, and data was collected from 349 ECE teachers. Each teacher completed a questionnaire during enrollment in the program, and another once enrollment ended, which included their engagement in physical activity. **Results:** The BWCW program showed an increase in physical activity positively correlated to a higher number of hours of engagement in the program,  $B = .034$ ,  $p = .008$ . At preintervention, 31% of teachers reported that they exercised regularly, and at postintervention, 37% of teachers reported they exercised regularly. This change was not statistically significant, but there was a significant positive association between hours of engagement in the program and change in physical activity. **Conclusion:** Findings revealed that embedding a wellbeing program into the workplace significantly impacted preintervention to postintervention change in physical activity. Not only did existence of the program make a difference to the participating teachers, but hours of engagement increased overall physical activity. Given the links between physical activity and overall health, results suggest that a program to support teachers' engagement in physical activity may also improve overall well-being. Improving teacher well-being may have implications for enhancing teachers' ability to provide relationship-based care that better helps children in their classrooms.

# SPECIAL THANKS & ACKNOWLEDGMENTS



*Kathleen Brady, MD, PhD*

## **DART Administrative Leaders, Staff, & Support**

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## **Additional Support**

Executive Committee on Education and Training Programs, MUSC

Department of Psychiatry and Behavioural Sciences & Department of Neuroscience, MUSC

National Institute on Drug Abuse (NIDA R25 DA020537)

The Drug Abuse Research Training Program (DART) provides a NIDA-sponsored research track for Psychiatry Residents and Summer Fellows at the Medical University of South Carolina.

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