2018 DART Summer Research Day
Poster Presentations

Friday, July 27th, 2018 || 10:00am – 12:00pm

Institute of Psychiatry, Main Lobby
Charleston, SC

Medical University of South Carolina
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2018 DART SUMMER FELLOWS

Undergraduate Students

Gabriella Barry, College of Charleston Honors College | Caroline Fields, Clemson University | Kosy Onochie, University of Massachusetts, Boston
Jacqueline Phillips, University of South Carolina Honors College
Leanna Poole, Binghamton University

Graduate Students

Logan Dowdle, MUSC | Erin Gandelman, Rosalind Franklin University of Medicine and Science | Caitlyn Hood, University of Kentucky

Jessica Norton, Auburn University | Jonathan J.K. Stoltman, West Virginia University
2018 DART SUMMER FELLOWS

Medical Students

Elizabeth Evans, MUSC  || Carlisle Hiott, MUSC  || Jack McLeod, MUSC
Victoria Ragland, University of Texas Rio Grande Valley School of Medicine

India Robinson, MUSC  || Justin Sindoni, University of South Carolina School of Medicine  || Serena Walker, MUSC

Post-Doctorate

Amanda Robinson, MD, MUSC
ABSTRACTS

POSTER #1

Understanding the functional role of the Arc using knockdown strategies in rat self-administration
Gabriella M. Barry, Rachel D. Penrod-Martin, PhD, Makoto Taniguchi, PhD, Dan McCalley,
Todd Nentwig, MS, & Christopher Cowen, PhD

Background: Drugs create lasting alterations in the brain function that contribute to its persistence. The molecular mechanisms of drug-dependent changes in medium spiny neurons (MSN), the primary type of neurons located in the Nucleus Accumbens (NAC), is mostly unknown. Previous research has shown that glutamatergic plasticity in the NAC is a locus for drug-induced changes in the brain. Understanding the molecular pathways regulation and consequences of changing of glutamatergic signaling is important for understanding, and treating, drug addiction. Acute cocaine exposure transiently up regulates activity-regulated cytoskeleton-associated protein (Arc) in the striatum of rodents. This effect gets stronger with repeated exposures. Arc is important as a regulator of AMPA receptor surface expression, which is also altered by cocaine experience and withdrawal. In order to understand Arc’s function in cocaine addiction, an Arc shRNA and cre-dependent shRNA target system were designed to knockdown the Arc gene expression in specific brain regions and study its effects. Methods: Rats received intra-Nac infusions of virus expressing shRNA directed against Arc or control. Following recovery, the rats received indwelling jugular catheters and were examined for their cocaine i.v. self-administration behavior. Cultured heterologous cells (HEK293) and mouse cortical neurons were co-transfected with plasmid DNA expressing cre-dependent shRNA directed against Arc or control and a second plasmid expressing cre recombinase. HEK293 cells were harvested and mRNA was collected to validate cre-dependent knockdown of Arc mRNA. Cultured neurons were fixed and processed for immunocytochemistry to validate cre-dependent knockdown of Arc protein. Results: Preliminary results indicate that loss of the Arc in the NAC reduces motivation for cocaine and enhances extinction of self-administration behavior. Also, preliminary results indicate a success of cre-dependent knockdown of Arc. Conclusions: Arc plays a role in cocaine related behavior and extinction learning. Future work will assess the cell type specific role of arc in these behavior models using the cre-dependent shRNA.

POSTER #2

Elevated Brain Responses to Pain in Individuals Using Prescription Opiates
Logan T. Dowdle, Jeffery J. Borckardt, PhD, Sudie E. Back, PhD, & Colleen A. Hanlon, PhD

Background: Prescription opiates have long been used as a highly effective treatment for acute pain. For chronic pain, opiates are less effective and may lead to increased pain sensitivity. The mechanisms responsible for this are currently unknown but may be related to changes in brain function. In this study, we hypothesized that individuals taking opiates as prescribed for pain (duration >6 months) would have elevated brain responses to acute pain relative to a control group. Methods: Participants (N=28, age=43.0±12.3, 29% male) were 14 individuals who use prescription opiates and 14 healthy controls. Participants were invited to MUSC and provided informed consent. Prior to a neuroimaging scan, we identified individually calibrated (‘7/10’ painful) temperatures. Each participant received 3 sessions with 8 blocks (14s duration) of painful heat on the left wrist. We then compared pain-related activation between groups and examined the effects of age, current pain, and opiate usage. Results: Prescription opiate users reported significantly greater current pain (3.4±3.4) compared to controls (0.2±0.8) on the Brief Pain Inventory (p<0.005). There was no significant difference between groups on individual temperatures or post-scan pain ratings. Opiate users had greater activity in somatosensory areas (pFWE≤0.001) and the anterior cingulate cortex (p≤0.01) in response to pain. On average, opiate users were prescribed 133.5±69.8mg morphine equivalent dosages. The amount of opiates prescribed was positively correlated...
with brain responses in these same areas. **Conclusions:** Despite the lack of group differences in self-reported pain measures, the opiate group evidenced elevated brain responses to pain, with greater opiate usage associated with larger pain responses. The findings underscore the need to develop novel treatments that target the neural mechanisms/circuitry of pain perception. Further work is needed to determine if these heightened brain responses to pain increase risk for developing pain disorders, engaging in non-medical prescription opiate use, or developing a prescription opioid use disorder.

POSTER #3

**Interpersonal Trauma and Stress Processing in Youth**

Elizabeth Evans, Casey Calhoun, PhD, Kathleen Crum, PhD, Christopher Sege, PhD, & Carla Kmett Danielson, PhD

**Background:** Relationships between childhood interpersonal trauma (IPT) and stress processing remain unclear. Presented here is a preliminary analysis of data collected by MUSC’s CHARM study, led by Dr. Carla Kmett Danielson. Multimodal analysis was used to investigate variation in functioning of distinct, yet interconnected neurobiological stress response systems among 3rd-, 6th- and 9th-graders, with and without history of IPT, under various stressful conditions. **Methods:** Youth were recruited from the Charleston area (N=75). Participants were categorized as having experienced any IPT (N=31) or no IPT (N=44) based on interview. To manipulate predictable and unpredictable stress, participants viewed images in an MRI scanner. Images were either emotionally negative or neutral, and presented after a countdown or unpredictably. Functional amygdala activity throughout the task was extracted. To manipulate social stress, participants were asked to give a speech about why they should be selected for a TV show. Baseline and Stressor cortisol measurements were collected, and Cortisol Reactivity was defined as the increase from Baseline to Stressor. To manipulate sustained stress, an error-monitoring task was administered alongside EEG recording. A negative deflection in the EEG, known as error-related negativity (ERN), is typically observed when a participant makes an error. ERN was quantified as the difference in EEG activity between error and correct trials (ΔERN). **Results:** Predictable/Unpredictable Stress: 3rd- and 9th-graders with IPT showed reduced amygdala activity compared to age-matched counterparts without IPT. The reverse was observed in 6th-graders. Social Stress: 3rd-graders with IPT had lower cortisol reactivity than 3rd-graders without IPT. Sustained Stress: 9th-graders with IPT demonstrated lower ΔERN than 9th-graders without IPT. **Conclusions:** For IPT-exposed youth, 6th grade may reflect a unique transitional period characterized by increased stress-related activation of subcortical regions (e.g., amygdala); whereas during earlier and later stages of puberty (i.e., when neurobiological development is more stable), IPT-exposed youth may experience blunting of stress responses.

POSTER #4

**Sexual Assault During College: The Role of Drinking Motives and Sexual Assault History**

Caroline Fields, Anna E. Jaffe, Dan Oesterle, Lauren Barnes, Leanna Pool & Amanda K. Gilmore, PhD

**Background:** Alcohol and sexual assault are related and both common on college campuses. In fact, 1 in 4 of college women report experiencing sexual assault in the past year and at least half or more of these occurrences take place after the perpetrator, victim, or both consume alcohol. Among drinking motives, drinking to cope or drinking to enhance are associated with higher levels of drinking. However, little research has examined how drinking motives relate to sexual assault in college. **Methods:** The current study examined the association between drinking motives and sexual assault in college among 280 college women who engaged in drinking in the past month. Participants answered online surveys about demographics, sexual assault history, and drinking motives. **Results:** Using a logistic regression model in MPlus, it was found that women who were in a sorority, were older, had a more severe history of sexual assault before
entering college. Additionally, women who had higher drinking motives for enhancement were more likely to experience sexual assault in college. Further, there was a significant interaction between enhancement motives for drinking and sexual assault history such that higher drinking for enhancement motives were associated with experiencing sexual assault in college among those with no or lower sexual assault severity before college. However, no differences in sexual assault during college based on drinking for enhancement motives were found for those with a severe sexual assault history before entering college. **Conclusions:** These findings extend previous work by examining drinking motives that are associated with experiencing sexual assault in college. Results from this study suggest that targeted intervention may be especially beneficial for college women who have experienced sexual assault prior to college, are sorority members, are older, and who have high drinking to enhance motives.

**POSTER #5**

**What’s In a Word?: Linguistic Traits of Prolonged Exposure Processing in the Treatment of Posttraumatic Stress Disorder and Substance Use Disorders**

Erin Gandelman, BA, Sean Kamperman, BS, & Sudie E. Back PhD

**Background:** Posttraumatic Stress Disorder (PTSD) is a highly common psychiatric disorder in the U.S. with an approximate lifetime prevalence rate of 8%. Prolonged Exposure (PE) therapy, an effective evidence-based treatment for PTSD, involves repeatedly recounting a traumatic memory (i.e., imaginal exposure) then briefly reviewing this experience (i.e., processing). Prior linguistic studies of PE have only examined imaginal exposures, not processing, and have shown inconsistent results. Recent literature reviews suggest PE processing, not only imaginal exposure, plays a large role in therapeutic change. Importantly, PE processing is tailored to an individual’s presenting needs and, therefore, less standardized than imaginal exposure procedures. The aim of this study was to compare PE processing language to Linguistic Inquiry Word Count (LIWC) natural speech normative data to identify unique linguistic characteristics of PE processing. **Methods:** Given limited available data, analyses were largely descriptive and exploratory in nature. Nine subjects with PTSD and Substance Use Disorders (SUD), enrolled in a larger NIDA-sponsored study (COPE, 2015), were given eight sessions of PE. Processing from these sessions were transcribed and analyzed using the LIWC program. Text analysis of processing was aggregated across therapy sessions and compared to natural speech normative data. **Results:** PE subjects showed notably higher percentages of words categorized as Authentic (+21.15%), Past Focused (+3.28%), and Cognitive Processes (+2.72%), as well as lower percentages of Emotional Tone (-51.15%), Clout (-30.33%), Analytical Thinking (-4.53%), Present Focus (-4.13%), Social Processes (-2.72%), and Affective Processes (-2.63%). **Conclusions:** These results suggest PE processing language is linguistically unique compared to natural speech norms. PE processing was more authentic, past focused, and indicative of cognitive processing. Furthermore, PE processing had more negative emotional tone, anxious style, informal thinking, and less present focus as well as social and affective processing. Findings may inform future treatments for PTSD and SUD by identifying linguistic changes related to positive treatment outcomes.

**POSTER #6**

**Differences in Gestational Age at Birth and Delivery Type in Women with and without a History of Depression**

Carlisle Hiott, Bernadette Cortese, PhD, Edie Douglas, MPH & Constance Guille, MD

**Background:** Women are twice as likely to suffer from depression compared to men, and approximately 15% of women will experience depression in the peripartum period (pregnancy and postpartum) (“Depression in Women,” 2016). Peripartum depression has slowly gained academic and cultural
recognition in the past few decades; however, the literature on how depression before and during pregnancy affects birth outcomes for the mother and baby has yielded varying and often conflicting results. Thus, we sought to determine whether a history of depression in mothers influenced their pregnancy outcomes. **Methods:** 630 women presenting to MUSC’s Reproductive Behavioral Health Program completed electronic questionnaires regarding demographics, psychiatric history, and current psychiatric complaints. Birth outcomes for the participants were reviewed in the electronic records to determine weeks gestation, birthweight, and delivery type. **Results:** Of the 385 participants with complete data, 194 (50.4%) reported a history of depression. There was a trend for reduced gestational age at delivery in women who positively reported a history of depression ($F_{1,380}=2.89$, $p=.09$). In fact, preterm birth was recorded in 19% of women with and 13% of women without a history of depression [$X^2(2, 385)=5.41$, $p=.067$]. Similarly at a trend-level, the data revealed an increased likelihood of scheduled C-sections in women with a history of depression [$X^2(5,385)=9.96$, $p=.076$]. **Conclusions:** These preliminary results have important clinical implications. For example, an additional week in gestational age among “full term” babies was related to increased brain gray matter density (Davis, 2011). These current trends warrant further research into the relationship between depression and pregnancy outcomes, including the addition of a non-psychiatric control group.

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**POSTER #7**

The effects of gender and oxytocin on smoking behavior following a social stress and laboratory relapse paradigm

Caitlyn O. Hood, Erin A. McClure, Nathaniel L. Baker, MS, Matthew J. Carpenter, PhD, Michael Saladin, PhD, Kevin M. Gray, MD, & Rachel L. Tomko, PhD

**Background.** Compared to males, female cigarette smokers evidence greater subjective (i.e., stress, craving, and negative affect) and behavioral (i.e., latency to smoke) responses to stressful cues. Evidence suggests that oxytocin may attenuate subjective stress responses among substance users. However, less is known about the impact of gender and oxytocin administration on smoking behavior (i.e., topography) in the laboratory following a social stress task. It was hypothesized that following stress induction, females would demonstrate more intense smoking topography (i.e., more puffs, greater volume, longer duration) compared to males, which would be attenuated by oxytocin. **Methods:** Nicotine-deprived adult cigarette smokers (N = 144; 61.9% female) participated in a laboratory visit. Participants were randomized to receive oxytocin or placebo before undergoing a stress paradigm (e.g., Trier Social Stress Task; TSST) and smoking resistance task (SRT). Topography was assessed following the SRT during a 1-hour Ad-libitum Smoking Period (ASP). Multivariate analysis of variance (MANOVA) tests were used to test the interactive and main global effects of gender (male vs. female) and oxytocin administration (placebo vs. oxytocin) on smoking topography measures (e.g., puff number, puff volume, puff duration, flow rate, time of peak, and inter-puff interval). **Results:** Following the SRT, neither the main effects nor the interactive effect of gender or medication administration on smoking topography were significant. **Conclusions:** The present study failed to detect gender- and oxytocin-influenced differences in stress-induced smoking intensity. Prior research indicates that females demonstrate less intense smoking topography than males, likely due to physiological differences (e.g., lung capacity, pharmacological effects of nicotine). Future research should assess gender differences in smoking behavior pre- and post-stress induction to better assess for the possible attenuating effect of oxytocin on stress-induced smoking.
POSTER #8

Developing a novel bipedal device and paradigm to investigate the neural circuits involved in lower extremity movement
John J. McLeod, Logan T. Dowdle, Daniel H. Lench, Ryan Downey, PhD, Christopher M. Gregory, PhD, & Colleen A. Hanlon, PhD

Background: Walking is an essential component of quality of life, however, several neurologic diseases interfere with this behavior. Although the principles of walking are well established, it has remained technically difficult to examine the neural correlates of this behavior. We sought to develop an MR-compatible bipedal device that can reliably measure the circuits engaged by bipedal movement. We tested the hypothesis that unilateral foot movement would result in elevated activity in the contralateral motor cortex and ipsilateral cerebellum, consistent with models of motor control. Methods: We developed an MR-compatible device that has independent foot pedals, quantifies torque and enables foot motion with limited head movement, all without inducing artifacts. Then we developed a software paradigm to display foot movement. Following pilot testing, 10 healthy subjects were recruited. Participants completed gait assessments and an fMRI using the new device. Neuroimaging data was collected while participants performed left, right, and alternating foot movements. Data were motion corrected, aligned to anatomy, transformed into standard space and smoothed. Estimates of motion were examined. Task events were convolved with a conventional hemodynamic response to determine areas of the brain activated during foot movement (SPM12, p<0.001; pFWE<0.01). Results: Preliminary analysis (n=8) demonstrated that, as a group, foot movement generated significant activity in the contralateral motor and ipsilateral cerebellar cortex. This pattern was present in all individuals during foot motion. Average head motion during the task was 0.09mm (range:0.07-0.13). Conclusions: This is the first demonstration of an MRI compatible, bipedal device and foot movement paradigm that can be performed without compromising data quality (i.e. excessive motion). Additionally, we demonstrated that we can reliably (and specifically) isolate activity in the contralateral motor cortex and ipsilateral cerebellum in healthy controls during movement. These data will serve as a foundation for future studies in patients with ambulatory disabilities.

POSTER #9

The Role of Educational Aspiration-Expectation Gaps in The Association Between School Interracial Climate and Student Risky Behavior
Jessica Norton, MS, Colleen Halliday-Boykins, PhD, Aimee McRae-Clark, PharmD, BCPP, & Sandra Graham, PhD

Background: Negative perceptions of school interracial climate predict more student discipline problems and inhibited college preparation. The mechanism by which school interracial climate effects adolescent behavioral outcomes has not been examined through research. Components of school climate have been found to predict students’ educational aspirations, expectations, and misalignment of the two, called the aspiration-expectation gap. Students with larger aspiration-expectation gaps, that is their educational aspirations exceed their educational expectations, report lower school bonding and more behavioral and emotional difficulties. Given that school interracial climate and aspiration-expectation gaps are associated with students’ behavioral outcomes, the current study aims to examine the mediating effect of students’ aspiration-expectation gaps in the relationship between school interracial climate and student engagement in risky behaviors. Additionally, this study tests whether racial differences exist for these relationships. Using data from a longitudinal school-based survey of 1,633 high school students, the current study found significant relationships between student perceived school interracial climate, aspiration-expectation gaps, and the development of students’ risky behaviors, including fighting, school discipline problems, and involvement with deviant peers. Overall, students’ aspiration-expectation gaps significantly mediate the relationship between school interracial climate and students’ risky behaviors. When examined using multi-group analysis, the indirect effect of school interracial climate on risky behavior, through students’
aspiration-expectation gaps, was only found for Black and White students. Findings of this study emphasize the effect of school interracial climate on students’ optimism about their educational attainment, and its effect on the development of students’ risky behaviors.

POSTER #10

PrEP instead of condoms? A new HIV prevention alternative perceived to restore sexual intimacy for serodiscordant couples

Kaosisochukwu Onochie, Jessie K. Mbwambo, MD, Jacob Ntogwisangu, Ping T. Yeh, MSPH, Natalie Dickson, MA, MPH, Michael D. Sweat, PhD, & Virginia Fonner, MPH, PhD

Background: Oral pre-exposure prophylaxis (PrEP) is recommended by the World Health Organisation (WHO) as an HIV prevention strategy for individuals at substantial risk for HIV, which includes HIV-negative partners in serodiscordant relationships. Clinical trials on PrEP proved its efficacy in preventing HIV transmission; however, distribution and implementation have been a challenge for many countries. As Tanzania plans a national roll-out of PrEP, we conducted a qualitative study to ascertain the people’s beliefs, opinions and suggestions about PrEP as part of the Dyadic-based Diagnosis, Care and Prevention (DDCP) study in Tanzania. Methods: Participants in serodiscordant relationships were purposively sampled from the Kisarawe District Hospital Care and Treatment Center (CTC) in Tanzania. Trained research assistants conducted in-depth, semi-structured interviews with participants using an interview guide containing questions on PrEP acceptability, attitudes, and beliefs. Interviews were conducted in Kiswahili, transcribed verbatim, and translated to English. We used thematic analysis to analyze data and elucidate perceptions of PrEP relevant to this population. Results: 44 participants (52% female, M age= 42) in serodiscordant relationships were interviewed. Major themes identified included: (1) the possible implications of PrEP on reduced condom use and increased sexual intimacy for serodiscordant couples and (2) the positive influence on the quality of the serodiscordant relationship beyond risk reduction. Conclusions: Findings of this qualitative study highlight the potential contribution of PrEP in bettering relations amongst serodiscordant couples but raise points of confusion regarding PrEP’s relationship to condom use as well as the concept of protection. Implications of the study demonstrate that people seek clarity on the use of condoms whilst on PrEP. It further implies the need for guidelines concerning PrEP use, and the effects the absence of such guidelines may have on medical advice for affected individuals.

POSTER #11

Is cannabis use age of onset associated with problematic cannabis use?

Jacqueline A. Phillips, Rafaela Vaca-Tricerri, Anna M. Porter, Erin A. McClure, PhD, & Lindsay M. Squeglia, PhD

Background: Cannabis is the most commonly used illicit drug and rates of use have been steadily increasing in the United States. Cannabis use among adolescents and young adults is common, with 10% of 14 year olds, 25% of 16 year olds, and 37% of 18 year olds reporting cannabis use in the past year. It is important to consider the potential adverse effects of the age of cannabis use initiation, specifically during adolescence as this is a particularly vulnerable developmental period. The goal of this study was to explore the relationship between the age of onset of cannabis use and problematic cannabis use. Methods: A sample of adult, regular (>5 cannabis use days per week) cannabis users (N=432; ages 18-76) were recruited using an Amazon Mechanical Turk survey. For this analysis, cannabis users were divided into early onset (<15 years old) and late onset (≥16 years old) cannabis use groups based on the age when they first used cannabis. An independent-samples t-test was conducted to compare total scores on the Cannabis Use Disorder Test (CUDIT-R), which is an indicator of problematic cannabis use, in early vs. late onset cannabis users. Results: Among all participants, 46% (N=197) were categorized as early onset cannabis users and
54% (N=235) were late onset cannabis users. Early onset cannabis users reported significantly higher CUDIT-R scores ($M=13.0$, $SD=6.0$) compared to the late onset group ($M=11.8$, $SD=5.4$; $p < .05$). **Conclusions:** Initiating cannabis use before age 16 was associated with more problematic cannabis use. The findings suggest that the prevention of cannabis early initiation is important because exposure to cannabis before age 16 may result in the development of more problematic cannabis use.

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**POSTER #12**

**Emotion Regulation and Dyadic Adjustment in Couples with Substance Use Disorder**

Leanna Poole, Julianne Flanagan, PhD, & Amber Jarnecke, PhD

**Background:** Emotion regulation (ER) strategies affect well-being across cognitive, social, and physiological domains. In couples, an individual’s ER is often strongly tied to their own relationship functioning and satisfaction as well as their partner’s relationship satisfaction. Emotion dysregulation is prevalent in nearly all DSM-5 disorders, including substance use disorder (SUD). In addition, emotion dysregulation has been shown to predict several maladaptive behaviors underlying SUD, such as poor impulse control, which is known to perpetuate relationship conflict. Most existing couple’s literature focuses on normative and healthy relationships and no studies to date have explored ER strategies among couples with SUD. The goal of the current study was to explore the relationship between ER and dyadic adjustment in a sample of couples in which at least one partner has SUD (N=30 couples). **Methods:** Cross-sectional self-report data collected from a larger human laboratory trial was used. **Results:** Actor partner modeling in a multilevel modeling framework, revealed that the self-reported use of both adaptive ($B = 0.32$, $SE = 0.14$, $p = 0.027$), and maladaptive ($B = 0.61$, $SE = 0.26$, $p = 0.022$) ER strategies (assessed using the Cognitive Emotion Regulation Questionnaire; CERQ) were associated with higher individual dyadic adjustment scores. Participants’ adaptive ($B = -0.12$, $SE = 0.13$, $p = 0.325$) and maladaptive $B = -0.04$, $SE = 0.23$, $p = 0.862$) ER strategies were not significantly associated with the dyadic adjustment of their partner **Conclusions:** These findings suggest that the active use of any ER strategy can positively impact an individual’s perception of their relationship. It should be noted that the measure of ER used did not include avoidance, which previous research has shown to be associated with maladaptive relationship functioning. Future studies could incorporate avoidant ER strategies as an additional predictor of dyadic adjustment.

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**POSTER #13**

**Associations of Neuropeptide Y (NPY) gene polymorphisms with substance use: A systematic review and meta-analysis**

Victoria E. Ragland, Ebele Compean, MD, Ayaba A. Logan, MLIS, MPH, Jeffrey E. Korte, PhD & Mark B. Hamner, MD

**Background:** Neuropeptide Y (NPY) is a highly conserved and expressed neuropeptide in the central nervous system with diverse functions that are not fully elucidated. High levels of NPY expression and affinity in brain regions associated with mood, anxiety, and substance use disorders suggest a potential role in their pathophysiology that should be explored. Associations between NPY gene polymorphisms (such as Leu7Pro) and substance use, especially alcohol use have been demonstrated in numerous clinical studies, providing support for NPY system involvement. However, these result findings are inconsistent and mixed. **Methods:** We evaluate the association between substance use and NPY gene polymorphisms while highlighting potential sources of interstudy variability by: (1) performing a systematic literature search and appraising relevant clinical studies; (2) identifying study heterogeneity to inform future study methodology; (3) quantifying the current strength of relationship between alcohol use and NPY gene polymorphisms by synthesizing the data in a meta-analysis. The systematic literature search was done using PubMed, SCOPUS, Cochrane, ProQuest, PsychINFO, EBSCO and other databases quality was assessed using the Newcastle—
Ottawa Scale. A random-effects model was used to calculate the odds ratio (OR) with a 95% confidence interval (CI) and a Z-test was used to calculate the P-value. **Results:** We found an association between alcohol use and the Leu7Pro (rs16139) polymorphism and do not report any other significant single nucleotide polymorphisms. **Conclusions:** The significant association between alcohol use and the Leu7Pro polymorphism identifies it as a risk factor and provides evidence for NPY involvement in alcohol use.

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**POSTER #14**

**Treatment Outcomes of Buprenorphine Maintenance Therapy in Opioid-Dependent Patients with Comorbid Dependence on Other Substances Compared with Those with Opioid Dependence Alone: A Retrospective Chart Review**

Amanda Robinson, MD & Bryan K. Tolliver, MD, PhD

**Background:** The prevalence of opioid dependence has reached epidemic proportions in the United States, constituting one of the worst public health crises in American history. At present, methadone, buprenorphine, and naltrexone are FDA-approved maintenance therapies for opioid dependence. However, limited evidence exists to suggest which of these medications is best for individual patients, a crucial issue given the high risk of mortality should patients fail or drop out of treatment. In particular, little is known about the effectiveness of buprenorphine in individuals with co-occurring dependence on multiple other substances. To assess whether opioid-dependent adults with co-occurring dependence on other substances had poorer retention and/or other outcomes while enrolled in outpatient buprenorphine treatment. **Methods:** A retrospective chart review of opioid-dependent patients enrolled in the buprenorphine program at the MUSC Center for Drug & Alcohol Programs (CDAP) outpatient clinic between 2012-2017. The primary outcome measure was retention in treatment. Secondary outcome measures included opioid-free urine screens and need for referral to a more intensive level of care. **Preliminary Results:** Of n=4,166 patients coded in the MUSC EMR as having opioid dependence, n=1046 (25.1%) had >1 encounter in the CDAP clinic. Of these, n=689 (65.9%) received at least one buprenorphine prescription. Of the 689 enrolled patients, n=321 (46.6%) were coded as having dependence on at least one other substance and n=130 (18.9%) were coded as having dependence on ≥2 other substances. Comparisons of outcome data in these two latter groups vs. outcomes in patients with opioid dependence alone are ongoing. **Conclusions:** Of opioid-dependent patients treated with buprenorphine in CDAP between 2012-2017, almost half were dependent on >1 other substance and almost 1 in 5 were dependent on ≥2 substances. The effectiveness of buprenorphine maintenance therapy in patients with comorbid addictions is an important unanswered question that this study seeks to elucidate.

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**POSTER #15**

**Characterizing the Effect of Predator Odor Exposure in C57BL/6J Mice**

India Robinson, Courtney King, Howard C. Becker, PhD, & Marcelo F. Lopez, PhD

**Background:** Previous clinical studies identify stress as one of the leading causes of relapse during a period of abstinence. Several studies conducted in this laboratory show that exposure to a predator odor can induce reinstatement of alcohol seeking behavior in mice. This effect is seen more prominently in mice with a previous history of chronic exposure to predator odor. The overall goal of this study is to evaluate the effects of predator odor exposure, specifically TMT (a component of fox feces), in order to describe subsequent behavior and determine if some animals are more or less sensitive to stress. Subjects exposed to a predator odor should show more signs of distress than control subjects, with some degree of variability in their response to stress. The first study evaluated the effects of TMT exposure, while the second study evaluated the behavioral response of these mice while exposed to the predator odor. **Methods:** In
Experiment 1, 100 C57BL/6J mice (50/sex) were separated in groups that either received TMT exposure alone, in combination with a pharmacological stressor (Yohimbine), or a control exposure. Following this 5-day exposure period, mice were evaluated for anxiety-related behaviors using an open field and a marble burying test. In Experiment 2, 72 C57BL/6J mice (36/sex) were also separated in groups that were exposed to TMT alone, in combination with Yohimbine, or a control exposure. During the 5 days of exposure, we videotaped the mice and cataloged stress behaviors at several time points during the 15-min exposure period. Following exposure, we performed a novelty suppressed feeding test and a sucrose preference test. **Results:** Preliminary results show that while chronic stress did not cause an overt change in several measures such as body weight, we did see behavioral differences between groups in grooming and roof climbing during exposure.

### POSTER #16

**Development of a Preprocessing and Intra-Individual Analysis Pipeline for Functional Neuroimaging Data in the Study of Bipolar Disorder and Alcohol Dependence**

Justin Sindoni, William Mellick, PhD, & James Prisciandaro, PhD

**Background:** Blood-oxygen-level-dependent (BOLD) functional magnetic resonance imaging (fMRI) is a neuroimaging method for observing brain activation in response to stimuli. fMRI research publications often present deceptively simple brain activation maps in results sections. These graphical representations are the end product of a methodologically rigorous approach to fMRI data collection, preprocessing, and analysis. This DART project focused on developing a well-planned structural and functional brain data quality control, preprocessing, and intra-individual (i.e., first-level) analysis pipeline using data from a recently completed study of Bipolar Disorder (BD), Alcohol Dependence (AD), and co-occurring BD and AD (BD+AD). **Methods:** 115 participants representing BD alone, AD alone, BD+AD, and healthy controls were administered diagnostic measures and subsequently underwent fMRI scanning with an alcohol cue exposure paradigm and a response-inhibition go-no-go task. The data acquired formed the foundation for this project. Linux-based bash shell scripting was implemented to manage, organize, and convert brain images to preprocessing-ready files. Statistical Parametric Mapping Software Version 12 (SPM12) was used to execute a preprocessing pipeline within MATLAB. Artifacts and outliers were examined with the Artifact Detection Toolbox using standard detection thresholds. First-level analysis of the fMRI data is ongoing. **Results:** Data were organized, verified for correct numbers of scans, and visually inspected. The preprocessing pipeline included: slice time correction, image realignment and unwarping, functional and anatomical coregistration, spatial normalization, and smoothing with 6mm3 and 8mm3 Gaussian kernels. Motion and artifact outliers were identified, and files generated formed regressors for first and second-level analyses. First level analysis results are forthcoming. **Conclusions:** This project provided the DART student training in computer scripting, fMRI data management, preprocessing, and first-level analysis methods. Moreover, preparations are complete for basic second-level analysis of the fMRI data. In all, a platform has been created for future publications, the first of which apply fMRI methods to BD+AD individuals.

### POSTER #17

**Delay discounting over time in current smokers amidst a smoking cessation attempt**

Jonathan J.K. Stoltman MS, MA & Bryan W. Heckman PhD

**Background:** Smoking is the leading cause of preventable mortality. Few psychosocial variables reliably predict smoking cessation success. Delay discounting is a behavioral economic paradigm that asks participants to choose smaller sooner rewards vs. larger later rewards. This insight into an individual’s decision-making processes may predict smoking cessation. To date, there is limited research available on
the change of delay discounting over the timeframe after a smoking cessation attempt. The aim of the current study was to examine change in discounting over time and how this may vary by quit success. **Methods:** Current smokers (N=292) with an intention to quit smoking during the next 30 days completed a brief monetary discounting task at five time points, each two weeks apart. Repeated measures ANOVA was used to compare discounting across three groups: those who sustained a quit attempt (n=83), sustained smoking (n=104), or relapsed after a cessation attempt (n=105). The sample was on average white (71.9%), males (70.2%) aged 35.1 (SD=9.4). **Results:** Discounting differed between the three groups (p < .05). Those who sustained a quit attempt over the 8-week follow-up period, had significantly lower discounting values at baseline compared to the sustained smoking and relapse groups. Over time, these differences remained, with sustained quitters having lower discounting at the final time point compared to baseline and significantly lower discounting than sustained smoking and relapse groups which converged by the final time point. **Discussion:** We found lower discounting rates among those that successfully quit, relative to smokers that had a failed quit attempt or did not attempt to quit. Previous work shows smoking cessation attempts can be difficult to sustain. Delay discounting might offer insight into subgroups of smokers that could benefit from more intensive counseling prior to, or during, a quit attempt, such as those with high discounting rates and ready to quit smoking.

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**POSTER #18**

**Relationship between Perceived Social Support and Outcome in Concurrent Treatment of PTSD and Substance Use Disorders using Prolonged Exposure**

Serena Walker, Elizabeth Santa Ana, PhD, Derik Yeager, & Sudie E. Back, PhD

**Background:** Concurrent treatment of substance use disorder and Prolonged exposure (COPE) integrates the treatment of substance use disorder (SUD) and posttraumatic stress disorder (PTSD). The in vivo experiences included in COPE often encourage strengthening of social systems and interpersonal relationships. As perceived social support has been shown to improve health outcomes, the current study describes the relationship between perceived low and high social support with participant characteristics and treatment outcomes. **Methods:** Military veterans randomized to COPE or cognitive behavioral therapy for SUD were divided into groups of low (n=35) and high (n=46) perceived social support based on the Interpersonal Support Evaluation List (ISEL). We examined differences between participants with low and high perceived social support on measures of depression, anxiety, PTSD symptomology, and suicidal behavior using two sample t-tests. Participants receiving COPE will be analyzed longitudinally to determine if those with low perceived social support exhibit significantly greater gains in outcome at a more rapid pace compared to their counterparts high in perceived social support. **Results:** Results from the two sample t-tests showed that participants with low perceived social support evidenced higher scores on the beck depression inventory, state-trait anxiety inventory, and PTSD checklist-Military compared to those with higher perceived social support (p<0.05). A trend towards significance was observed among participants with low perceived social support indicating they reported greater current suicidal thoughts (p=0.051). No statistically significant differences were observed on any substance use outcome, lifetime suicidal thoughts and attempts, or recent suicide attempts. **Conclusions:** In summary, participants low in perceived social support evidenced significantly worse depression, and greater anxiety and PTSD symptomology and greater current suicidal thoughts, although this latter finding was N.S. Results from the longitudinal analyses are pending. Findings from this study may support the importance of therapeutic activities to enhance perceived social support among patients being treated concurrently for PTSD and SUD.
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