

2020 VCU Digital Archive For Undergraduate Research and Creativity



**An online showcase and archive profiling our
undergraduate research and student scholarship.**

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Virginia Commonwealth University

Undergraduate Research Opportunities Program



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We would like to express our gratitude to our faculty and students who were able to submit their research for our digital archive, especially in light of the challenges presented by COVID-19. Additional thanks to VCU Libraries and Scholars Compass for providing an online platform for the dissemination of our students' mentored research and scholarly work.

All abstracts are searchable by using CTRL+F and inputting your name or your student's name.

1. Tobacco Use Prevention: Culturally-Specific Protective Processes in College Students with Asthma

Vanessa Atra, Depts. of Biology, Psychology, & Chemistry, with Dr. Rosalie Corona, Dept. of Psychology

The African American and Latinx communities are disproportionately affected by health disparities such as cancer. Recent cancer statistics shows death rates of African American men and women at a high of 33% and 16%, respectively, as compared to Caucasian men and women¹ it is the leading cause of death in Latinx individuals.² Minority college students of this group have higher risk of developing cancer later in life; thus this study focuses on examining associations between cancer risk factors (e.g., stress, family history of cancer, poor asthma control), differences in cancer risks factors and tobacco use/frequency of use in African American and Latinx College students with asthma and how these factors are associated with secondhand smoke (SHS) and its outcomes. Recruitment is being done through telegram announcements, website text, text messages, flyers, and E-mail invitations. The investigators seek to recruit 200 college students in Virginia; 100 African Americans and 100 Latinx college students with asthma or who have asthma-like symptoms and are between the ages of 18 and 20. Screening forms and script survey are being used to determine participants eligibility, and participants receive \$25 gift card for completing the questionnaires. So far, 135 students have completed the questionnaire on Redcap; the research is ongoing and is supposed to run for two years. The researchers will begin analysis of the data once the target sample size has been met.

2. Chemical Composition of Airborne PM10 Particles from the Salton Sea Playa: Development and Severity of Asthma in Children under 14 in Imperial County

Margaret Colangelo, Depts. of Communication Arts and Environmental Studies, with Prof. Mary Boyes, VCU Honors College

I was prompted to begin this paper after reading about a water transfer agreement which will significantly reduce the water levels of the Salton Sea beginning in January 2018. Concerns over the impact this change would have on local air quality and how air quality changes would affect respiratory health, particularly in children were present in the community. I chose to investigate the validity of these concerns. The recession of the Salton Sea will expose large areas of playa, or lakebed, that has been significantly polluted by the agricultural runoff that feeds the Salton Sea. In order to determine the impact this change may have on the air quality of nearby Imperial Valley and what effect airborne pollutants could have on local respiratory health, I studied journals concerning the predicted levels of dust from the exposed playa. Another important aspect of the dust emitted from the playa is the particle mass PM10, which several journals connected to a decrease in childhood respiratory health. I also explored journals which connected persistent organic pollutants which are commonly used in agriculture to respiratory distress and the development of asthma. I focused on journals which studied the levels of the same pollutants in the Salton Sea sediment as well. From my research, I found that the composition, as well as the particle mass of the dust emitted by Salton Sea playa will have a significant negative impact on the respiratory health and development of asthma in Imperial Valley children. Furthermore, the levels of dust emitted by the Salton Sea are expected to increase dramatically as the sea recedes. Continued research and studies should be conducted on the exact composition of airborne pollutants produced by the sea, and their specific impact on childhood respiratory health and asthma development.

3. Negative Assortative Mating in Prothonotary Warblers: Crown Feathers Reveal Mating Preference

Jordan Rasure, Depts. of Biology, Spanish, & Chemistry and Elsa Chen, Dept. of Biology, with Dr. Lesley Bulluck, Center for Environmental Studies

While male ornamentation has been the subject of many avian studies, there is a dearth of studies on their female equivalents. Several studies have evaluated male ornamentation as an indication of individual quality and a driving factor in mate choice. Spectral analysis of feathers has revealed that color intensity can be interpreted as an indicator of both aggression and parental quality. We evaluated the correlation between male and female ornamentation in prothonotary warblers (*Protonotaria citrea*) to determine whether individuals select mates that share their same plumage characteristics. We collected 46 samples of crown and breast feathers from 46 individuals (23 breeding pairs) across two study sites in eastern Virginia, USA. From these samples, we measured reflectance and calculated three color metrics: violet-blue chroma (an index of carotenoid content), ultraviolet chroma, and yellow intensity. After ruling out age as a confounding variable, we found a significant negative correlation between the yellow intensity of female crown feathers and the yellow intensity of her respective male's crown feathers. This finding suggests a pattern of non-assortative mating in prothonotary warblers, which may be explained by a trade-off between parental quality and aggression. Further studies are needed to expand the sample size of breeding pairs and to evaluate the role of ornamentation in parental care and aggression.

4. Storytelling Through Play

Allison Heerwagen, Depts. of Graphic Design and Anthropology, with Dr. Bernard Means, Dept. of Anthropology

As children interpret and build on narratives with their own imagination, storytelling as a cultural practice involves even the youngest of a community. Children raised with folktales, myths, legends, and more can bring the stories to life through play inspired by the characters, setting, and stories shared with them. The most accessible tools for children to share and build stories are toys that can be used to interpret the beliefs, practices, and imagination of their culture. In addition, many children's toys are objects that serve as a reflection and translation of their culture's written and oral history. In this way, toys can be intrinsically tied to narratives—fiction or nonfiction, fantasy or rooted in reality—that play out during specific historical events and cultural environments. The way children play, and what they play with, shows how they are able to reinterpret and communicate their everyday experiences. Combined with imaginative creation and fantasy, children contribute to the narrative through their lens.

5. Victim Silencing, Sexual Violence Culture, Social Healing: Inherited Collective Trauma of World War II South Korean Military "Comfort Women"

MiJin Cho, Depts. of Psychology and English, with Prof. Mary Boyes, VCU Honors College

The unresolved reconciliation process for WWII South Korean military "comfort women" presents a case of nationally inherited collective trauma, in which South Koreans far removed in time and space from the historical tragedy feel its implications and obligations for reparations and social healing. In examining the South Korean comfort women redress

movement and systemic concealment of WWII military sexual slavery, this study investigates a pattern of victim silencing, characterized by institutional patriarchy and ineffective government involvement, from 1945 to 2019. Following the South Korean government's formal rejection of the 2015 agreement with Japan regarding a final and irreversible conclusion to the comfort women issue, South Korean and international women's rights organizations have openly addressed a need for new reconciliation efforts with Japan; however, the current stance of the South Korean government, under President Moon Jae-in, remains hesitant to seek a renegotiation. Based on the effective methods of democratic reparations from South Africa, Germany, and the United States, this study proposes a new victim-centered approach to the reconciliation of collective trauma through the role of the South Korean government. The new approach encompasses the following: (1) organizing an official collection of victim testimonies, (2) fostering government relationships with women's rights organizations, and (3) instating sexual violence education in university settings in order to facilitate long-term social healing.

6. Owner-Intruder Contests with Information Asymmetry

Faheem Farooq, Depts. of Biology and Chemistry, Jay Bisen, Manaeil Hasan, and Akhil Patel, with Dr. Jan Rychtar, Dept. of Mathematics and Discrete Mathematics, and Dr. Dewey T. Taylor, Dept. of Mathematics and Discrete Mathematics

We consider kleptoparasitic interactions between two individuals - Owner and Intruder - and model the situation as a sequential game in an extensive form. Owner is in a possession of a valuable resource when it spots Intruder. Owner has to decide whether to defend the resource; if the Owner defends, the Intruder has to decide whether to fight with the Owner. The individuals may value the resource differently and we distinguish three information cases: (a) both individuals know resource values to both of them, (b) individuals know only their own valuation, (c) individuals do not know the value at all. We solve the game in all three cases. We find that it is typically beneficial for the individuals to know as much information as possible. However, we identify several scenarios where knowing less seems better. We also show that an individual may or may not benefit from their opponent knowing less. Finally, we consider the same kind of interactions but with the reversed order of decisions. We find that typically the individual initiating the interaction has an advantage. However, when individuals know only their own valuation and not the valuations to their opponents, it is sometimes better when the opponent initiates.

7. A Review and a Proposal for Reducing the Symptoms of Attention-Deficit/Hyperactivity Disorder in Adolescents by Combining Mindfulness-Based Stress Reduction Training and Methylphenidate Medication as a Treatment

Kirti Sharma, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder among adolescents that may lead to impaired executive functioning and poor mental development. In 2018, the National Health Interview Survey reported that from 1997 to 2016, the prevalence of ADHD significantly increased from 6.1% to 10.2% in children and adolescents (age 4 to 17 years). Medication, such as methylphenidate, is considered as first-line therapy for reducing symptoms of ADHD. However, medication may produce adverse side-effects such as insomnia, loss of appetite, abdominal pain, and stress. Also, due to its lack of long-term effectiveness, medication may inflict an extra financial burden

on the families of adolescents with ADHD. To balance the challenges of medication-based therapy, extant psychological research has shown that mindfulness-based practices are also efficacious in managing symptoms of ADHD. A review of two bodies of scientific research was conducted: (a) the use of medication for treating ADHD, and (b) the use of mindfulness-based practices as a therapy for ADHD in children and adolescents. The research analysis revealed that in most cases, higher doses of methylphenidate is needed to effectively counter ADHD symptoms, leading to a significant cost burden for the families. The review of the literature related to mindfulness-based practices for treating ADHD indicated its effectiveness in attention-regulation, cost-effectiveness, and long-term effects. Based on the analysis, it is proposed that a treatment combining methylphenidate medication and the Mindfulness-Based Stress Reduction (MBSR) program, a mindfulness-based practice, could be an effective therapy for reducing the symptoms of ADHD in adolescents. The findings from this study may add to the conventional medication-based methods for treating ADHD in adolescents by combining with mindfulness-based practices.

8. Transit Manipulation by the Koch Brothers: Analyzing the Relationship between the Division of Power in the United States Government, Societal Benefits, Voter and Rider Composition, Referendum Language and Cost of Improvement Under the Lens of the 2018 Nashville Transit Improvement Program Referendum

Samantha Lee, Depts. of Biology and Chemistry, with Prof. Mary Boyes, VCU Honors College

In Nashville, Tennessee, Charles and David Koch, known as the Koch Brothers, manipulated these areas--the division of power in the United States government, change in leadership, societal benefits, voter and rider composition, referendum language and cost of the improvement--in order to turn what was initially positive voter feedback into a roadblock for the 2018 Nashville Transit Improvement Program Referendum, even though many voters would have benefitted from such a system. The federal government focuses on the united country whereas the state governments account solely for their respective interests, causing projects in states that received the majority of the funding for the 2010 national high-speed rail to fail since they misrepresented the expectations of the people, alluding to the systemic bias in funding against public transportation in comparison to automobiles. The voter and rider composition of Nashville, specifically the \$49,391 median household income contributed to failure of the 2018 Nashville Transit Improvement Program Referendum as the project was neither affordable nor relevant for voting residents, exemplified by the election results. Pro-public transportation voting Americans support public transit because of social benefits: reduction of congestion, cleaner environment, aid for the poor and socially excluded, revitalization of cities, and job creation, resulting in limited in-support votes and ridership, reflecting the greater influence of self-interest on voters, especially when taxes are involved. The referendum language and estimated \$5.4 billion project cost prompted the Nashville voters to become dissuaded because of their socioeconomic status, supported by their unwillingness to pay. Understanding the failure of the 2018 Nashville Transit Improvement Program Referendum was a result of the Nashville's societal and economic conditions that were exploited by conservative political groups, such as Americans for Prosperity, one can apply such knowledge to future transportation referendums and mirror or counteract the Koch Brothers' actions to prompt successful passage.

9. Pelvic Binding Protocols in EMS

Tarek Haggy, Depts. of Science and Chemistry, with Dr. Susan Bodnar-Deren, Dept of Sociology

Background: Pelvic fractures are typically a result of high energy collisions, such as motor vehicle accidents (MVAs). For this reason, pelvic trauma is usually accompanied by a myriad of other injuries. Due to the potentially fatal nature of the injury, Emergency Medical Service (EMS) providers are often the first to administer treatment to patients with suspected pelvic fractures. While difficult to make a proper diagnosis in the field, it is essential to properly stabilize the pelvis whenever a fracture is suspected. **Objectives:** We suspect that there may be a deficit between regional pelvic immobilization protocols and perceived EMS provider competency in pelvic binding. This study aims to identify if there is an inherent lack of training/emphasis on current prehospital pelvic binding techniques. **Methods:** A survey will be sent out to prehospital providers in Virginia to gauge perceived competency in pelvic binding and prior training in the technique. Questions will address provider experience, EMS locality, confidence level, and the level of training exposure. **Expected Results:** We are expecting a lack of emphasis on formal pelvic immobilization training among prehospital providers, especially in EMT-Basics. However, we believe some providers will feel confident in this skill simply due to the deceiving simplicity of pelvic binder application. That said, we expect that EMS providers with extensive experience, training beyond a basic EMT course, or those that practice in more rural localities will have had greater training and exposure to proper pelvic binding technique.

10. Correlation of Acculturation in the U.S. and Oral Health Knowledge

Abigail Manzano, Dept. of Kinesiology, and Tatiana Kohlmann, with Dr. Aderonke A. Akinkugbe, VCU School of Dentistry and Dr. Sarah Raskin, L. Douglas Wilder School

Introduction: The United States (U.S.) is one of the top leading nations among developed countries, with the highest infant mortality rates, obesity rates, and chronic disease rates. Healthcare disparities and inequalities across the U.S. are becoming an increasing problem; low-income and minority families are regularly denied basic healthcare or simply cannot afford care. Thus, the current study assessed the relationship between time since settling in the U.S. and the oral health knowledge of a sample of low-income immigrants served at a free clinic in Richmond, Virginia. **Methods:** Patients from the CrossOver Healthcare Ministry clinics were recruited to measure reasons for dental disengagement. The staff at the clinics developed and provided a list of patients that have not been to the clinic in over a year or at all. Eligible participants were asked to complete a consent form and surveys on dental health status, socioeconomic status, and associated health conditions (e.g., chronic diseases, diabetes, etc.). Oral health knowledge was assessed using a validated instrument, the Comprehensive Measure of Oral Health Knowledge (CMOHK) that included a set of 25 questions designed to help understand the patient's knowledge of dental health. Given that a majority of the patients that register with the CrossOver clinics are Latinx and Spanish-speaking individuals, the surveys were administered in both English and Spanish, depending on the patient's preference. Responses from the surveys were entered into a protected, online research portal (REDCap) and will subsequently be analyzed using SAS. We plan to produce descriptive statistics using means and standard deviations or frequencies and relative frequencies and assess differences in oral health knowledge according to time since settling in the U.S. using t-tests or chi square tests. **Results:** Participant recruitment and data collection are still ongoing; however, I hypothesize that

those that have acculturated to the U.S. for more than 10 years would yield the highest CMOHK scores. **Conclusions:** Minorities and low-income individuals often neglect their own dental care needs for various reasons, this study will help us understand if length of stay in the U.S. affects oral health knowledge.

11. The Effect of Education on Knowledge of Dental Care and Hygiene in Adults

Jenifer Euceda Nunez, Dept. of Homeland Security, with Dr. Sarah Raskin, L. Douglas Wilder School of Government and Public Affairs

Introduction: Dental care and hygiene are a common worry and often overlooked by adults. It is paid less attention to due to dental problems not occurring as often as other medical conditions and simply not having the sufficient knowledge. Individuals' lack of knowledge on dental care and hygiene may reflect other educational gaps. This study assessed the relationship between educational attainment and knowledge of oral health among a sample of low-income immigrants served at a free clinic in Richmond, Virginia.

Methods: Patients from Crossover HealthCare Ministry clinics were recruited to complete a survey about their oral health experiences, quality of life, and knowledge, such as names of certain areas in the mouth, and what factors can cause certain diseases. Oral health knowledge was assessed using the Comprehensive Measure of Oral Health Knowledge, a 25-question instrument that has been validated in English and Spanish. The research team entered study data into a secure online research survey system, REDCap; data was analyzed using SAS. Participant recruitment and data collection are still ongoing. Initial analysis focuses on descriptive statistics using means (M)/standard deviations (SDs) or frequencies/relative frequencies to assess differences in oral health knowledge across educational attainment, using t-tests for continuous variables and chi square test for categorical variables. **Results: We expect to see more incorrect answers from the CMOHK in individuals with lower levels of educational background. Conclusions:** This study aids in understanding educational impact on dental care. If lower educational levels are associated with lower oral health knowledge as measured by incorrect answers they will have on the CMOHK, intervention for this group would be salient.

12. The Role of Cultural Competency on Treatment Adherence and Health Literacy for Persons of Color Living with HIV/AIDS

Rohan Arora, Depts. of Psychology, Medical Humanities, & Chemistry, with Dr. Faye Pritchard, VCU Honors College

For decades, the American medical establishment has been a notable perpetrator in the mass marginalization of minority groups, leading to a variety of health disparities. Given that the existing healthcare institution is not culturally equipped to serve the evolving American demographic, experts have called for the greater usage of cultural competency in medicine; however, little research has been done to better understand how the degree of cultural competency of a health-care provider impacts the complex disease management for those living with HIV/AIDS. The aim of this research is to better understand how cultural competency can impact the health literacy and treatment adherence for persons of color living with HIV/AIDS. In addition to considering what factors shape patient experience and expectations, the research explores how many socioeconomic and cultural factors lead to low treatment adherence and health literacy. Also, the research considers the nuance in the patient-provider relationship and explores tools, such as partnerships with existing community institutions, that may strengthen the relationship. In order to regain the trust

lost in the medical establishment by persons of color living with HIV/AIDS, the research suggests that a healthcare provider ought to self-reflect about the cultural, linguistic, and socioeconomic complexities in America that necessitate cultural competency. By practicing modernized cultural competency in medicine, healthcare providers can shape patient care and strengthen the patient-provider relationship, which may increase treatment adherence and health literacy rates for persons of color living with HIV/AIDS. Bringing attention to how cultural competency can impact treatment adherence and health literacy, the research urges the medical establishment to take educational and policy-related steps to effectively provide healthcare to historically underserved groups such as people of color living with HIV/AIDS.

13. Game-Theoretical Model of Retroactive Hepatitis B Vaccination in China

Vooha Putalapattu, Depts. of Psychology, Chemistry, & Biology, with Dr. Jan Rychtar, Dept. of Mathematics

Hepatitis B (HepB) is one of the most common infectious diseases affecting over two billion people worldwide. About one third of all HepB cases are in China. In recent years, China made significant efforts to implement a nationwide HepB vaccination program and reduced the number of unvaccinated infants from 30% to 10%. However, many individuals still remain unprotected, particularly those born before 2003. Consequently, a catch-up retroactive vaccination is an important and especially cost-effective way to reduce HepB prevalence. In this paper, we analyze a game theoretical model of HepB dynamics that incorporates government-provided vaccination at birth coupled with voluntary retroactive vaccinations. We show that this retroactive vaccination should be a necessary component of any HepB eradication effort. Due to the vaccine waning, the optimal vaccination rates are almost independent of the vaccination coverage at birth. Moreover, it is in an individual's self-interest to vaccinate (and re-vaccinate) at a rate just slightly below the vaccine waning rate.

14. GABRA2 and Alcohol Dependence in College-aged Students

Abaiz Chaudhri, Depts. of Biology and Chemistry, with Dr. Amy Adkins and Dr. Sally Kuo, Dept. of Psychology

Problematic alcohol use and associated consequences is a major problem in college-aged students. These outcomes, and alcohol dependence (uncontrolled alcohol consumption despite consequences), are complex and influenced by genetics and environmental factors, and the interplay between both. Variants in the gene *GABRA2* have been shown to be associated with alcohol dependence in adolescents and older adults, yet the association is not studied nearly enough in the college-aged population, a high-risk period for the development of alcohol-related problems. The hypothesis of this study is that *GABRA2* is associated with alcohol dependence in college-aged students of European and African ancestry. The data was obtained from Spit4Science, where surveys were given to college students and saliva samples were collected and DNA extracted. The results indicate that the 8 genetic variants studied showed no significant association between *GABRA2* and alcohol dependence in either ancestry. Our results suggest that further research needs to be conducted, either on the same or different genetic variants to see whether there may still be an association. This study adds a primary look at *GABRA2* as it relates to alcohol dependence within a college-aged sample.

15. Assessing Sexual Differences with the Decision to Remain a Virgin

Jessica Del Rossi, Depts. of Biology and Sociology, with Dr. Claire Kimberly, Dept. of Internal Medicine, VCU School of Medicine

In the transition to adulthood, the loss of virginity can be seen as an important step in personal development. The first sexual experience someone encounters is often memorable with a positive or negative interaction impacting sexual satisfaction and sexual communication in the future. People have different definitions of virginity which can lead to miscommunication in personal relationships, research and/or a therapy setting. People may remain a virgin till marriage due to religious convictions and gender differences. Data was collected from 531 adults through Qualtrics and included questions about demographics, definition of virginity, and sexual satisfaction/communication. Respondents included 62.9% of the people thought at one point in their life they would remain a virgin until marriage while 36.9% reported that they did not. Average responses for sexual communication and satisfaction were reviewed by whether or not the individual decided at some point to be a virgin and demographics. Notable gender differences were found with men who decided not to be a virgin at one point in their life having higher sexual communication when compared to women who had decided not to remain a virgin. However, women who decided to be a virgin at one point had higher sexual satisfaction later on when compared to men and women who did not decide to be a virgin at one point in their lives. In regards to interest in religion, people that stated that religion was unimportant and had not decided to be a virgin had higher sexual satisfaction later on than people who thought religion was important and had decided to be a virgin. The results have the potential to help people in research, education, and therapy. Specifically, it can supplement the knowledge about gender differences and religion when it comes to virginity loss and how it might impact current relationships.

16. Latinx Immigrants' Healthcare Access: Barriers, Consequences and Strategies for the Future

Ashley Victor, Dept. of Bioinformatics, with Dr. Indira Sultanic, VCU School of World Studies

As the largest minority group in America, the Latinx population faces significant obstacles to receiving equitable healthcare. The Collective Corazón—a VCU student organization that addresses Latinx healthy equity through service and advocacy—performed a meta-analysis to pinpoint the barriers that the Latinx population faces in health care, determine the consequences in the community, and formulate strategies for the future. This study found that overall, immigrants tend to have lower rates of healthcare coverage compared to people born in the United States. Latinx immigrants in particular struggle because of language barriers within the healthcare system, as well as a lack of cultural competency of healthcare workers, and the inability to obtain health insurance because of their immigration and socioeconomic status. These factors lead to poor health outcomes for Latinx immigrants that are not seen in members of the community born in the United States, including low birth weights, chronic conditions like diabetes and asthma, and musculoskeletal problems. Based on these findings, this study posits that these disparities can be mitigated by addressing language and cultural barriers through training programs centered around cultural humility, the increased use of professional interpreters, and the development of community health resources, like school-based health centers.

17. Phenotypic Expression of Two Candidate Genes of Nonsyndromic

Craniosynostosis in *Danio rerio*

Annemarie Carver, Dept. of Biology with Dr. Rita Shiang, Dept. of Human and Molecular Genetics

Craniosynostosis, the premature fusion of cranial sutures, can be either syndromic or nonsyndromic. The majority of cases are nonsyndromic, the causes of which are rarely known. Craniosynostosis is relatively common and occurs in about 1 in every 2,000 babies. *Bambia* is suspected to cause craniosynostosis as a predicted deleterious stabilizing variant has been identified in affected individuals within one family, though when normally or under expressed no phenotypic differences are observed. *Slc30a9*, a gene involved in zinc transport within cells, is also suspected to cause craniosynostosis as a predicted pathogenic variant was also identified in the same family, the variant is predicted to replace a leucine with proline. It is hypothesized that when the gene *bambia* is overexpressed or the null *slc30a9* mutant gene is present in *Danio rerio*, phenotypic characteristics of craniosynostosis will be observed when compared to wildtype animals. The purpose of this study is to determine whether a phenotypic difference occurs in the development of the skull when the gene *bambia* is overexpressed or when *slc30a9* is mutated in *D. rerio*, zebrafish. Wholemount *in situ* hybridization and observation of 8 weeks of skull development of zebrafish were performed to test this hypothesis. The results of this study could be used to identify causes for nonsyndromic craniosynostosis and help to learn more about the condition.

18. Differences in Mental Health and Ethnic-Racial Identity between White Gender Variant Students and Gender Variant Students of Color

Xuxa Sky Lark, Depts. of International Social Justice and French, Arlenis Santana, Dept. of Psychology Graduate Student, & Chloe Walker, Dept. of Psychology Graduate Student, with Dr. Diamond Y. Bravo, Dept. of Psychology, University of California, Riverside, and Dr. Chelsea Derlan Williams, Dr. Amy Adkins, and Dr. Danielle M. Dick, Dept. of Psychology

Gender variant college students (i.e., transgender, genderqueer, and questioning) experience increased risk for mental health disparities, discrimination, bullying, family disownment, homelessness, and hate crimes, to name a few (Eisenberg, 2017). Further disparities arise when the intersections of gender and race are both considered; however, few studies have tested ethnic-racial identity (ERI) development among gender variant individuals (Kattari, 2016), which is predominantly tested in cisgender populations (e.g., Aoyagi et al, 2017; Umaña-Taylor et al., 2014). This is a notable gap given that ERI is a normative aspect of adolescence and emerging adulthood that is associated with positive development (Umaña-Taylor et al., 2014). Understanding ERI and mental health among diverse gender variant individuals is important to be able to create effective interventions and resources across ethnic-racial backgrounds that considers individuals' unique lived experiences (Mossakowski, 2003). To address these gaps, the current study, grounded in the minority stress framework (Meyer, 2003) and ERI frameworks (Umaña-Taylor et al., 2014), tested differences in mental health (i.e., anxiety and depression) and ERI (i.e., exploration, resolution, and affirmation) between White gender variant students and gender variant students of color. The sample in the current study was from a larger university-wide study (i.e., Spit for Science; Dick et al., 2014), and consisted of 112 ethnically diverse gender variant students who identified as a White student (n = 72) or identified as a student of color (n = 40) in college. Students ranged in age from 18-24 years old (M = 20.15, SD = 1.61), and were 4.6% transgender women, 11.11% transgender men, 30.16%

questioning, and 53.97% genderqueer. The Symptom Checklist 90-R (SCL-90-R; Derogatis & Cleary, 1977) was used to measure levels of depression and anxiety, and the Ethnic Identity Scale-Brief (EIS-B; Douglass & Umaña-Taylor, 2015) was used to assess ERI exploration, resolution, and affirmation. First, descriptive statistics were conducted to examine correlations among variables (Table 1). Next, hypotheses were tested with five t-tests that tested mean differences in mental health and ERI between gender variant White students and students of color. Findings indicated gender variant students of color (compared to White gender variant students) had significantly higher ERI exploration ($t(107) = -6.49, p = .00$), ERI affirmation ($t(106) = -2.23, p = .03$), and ERI resolution ($t(106) = -5.61, p = .00$). Although gender variant students of color had higher mean levels of anxiety and depression than White gender variant students, this difference was not significant ($p > .05$). Discussion will center on how ERI may be a protective factor for gender identity-based risk factors among gender variant students of color, which will be a fruitful area for continued investigation and intervention efforts.

19. Does Sexual Orientation Moderate between Partner Substance Use and Alcohol Consumption?

Jasmine Jones, Depts. of Psychology and African American Studies, with Dr. Jessica Salvatore, Dept. of Psychology

Being with an antisocial partner can be challenging in various ways. Prior research suggests that involvement with an antisocial partner is associated with higher levels of substance use (Fleming, White, and Catalano 2010). Having a minority sexual orientation can also influence one's own substance use. Prior research shows that individuals who identify as a sexual minority report higher levels of substance use compared to those who identify as heterosexual (Hughes, Wilsnack, Kantor 2016). Despite the robust associations between partner antisocial behavior, alcohol consumption, and sexual orientation there is little research looking at whether the association between having an antisocial partner and alcohol consumption differs as a function of sexual orientation. The aim for this study was to examine whether the association between a partner's antisocial behavior and alcohol use differs as a function of sexual orientation. Participants came from "Spit for Science," a university research opportunity for any freshman that would like to participate. Participants ($N = 1502$, 70.8% female) were invited to participate in surveys during their freshman year and every spring semester after. We used a subset based on participants who reported to be in a relationship during the spring semester of their freshman year. Consistent with prior research and our hypothesis, having a partner with higher substance use is associated with higher levels of alcohol consumption. Contrary to our hypothesis, we did not find evidence that partner substance use and alcohol consumption differed as a function of sexual orientation. Individuals who are involved with someone who consumes alcohol will consume more alcohol, however, this does not differ as a function of sexual orientation.

20. Impulsivity in Sexual Trauma Survivors and their Use of Alcohol and Substances

Kayla McLean, Dept. of Psychology, with Dr. Jasmin Vassileva, Depts. of Psychology and Psychiatry

The current study investigates the associations of neurocognitive 'choice' impulsivity (delay discounting) and personality 'trait' impulsivity (UPPS Impulsive Behavior Scale) with alcohol and substance use among female college students reporting history of sexual trauma.

Participants included 2476 students enrolled in the Spit for Science study of college student mental health at VCU. Bivariate correlations were used to examine the associations between lifetime use of alcohol and different types of drugs with delay discounting and trait impulsivity among female students reporting history of sexual trauma (N=688). The results revealed that only cannabis ($r=0.10$, $p<.05$) and prescription stimulants ($r=0.11$, $p<.05$) were significantly correlated with delay discounting, particularly of rewards of small magnitude. Emotion-related factors of the UPPS trait impulsivity (negative urgency, positive urgency, and sensation seeking), showed positive relationships with cannabis ($r=0.34$, $p<.01$), opioids ($r=0.27$, $p<.05$), stimulants ($r=0.23$, $p<.05$), prescription sedatives ($r=0.43$, $p<.05$) and prescription anxiolytics ($r=0.43$, $p<.05$). These results may indicate substance use as a means of coping with the emotional effects of sexual trauma.

21. How Much Wood Could a Woodchuck Chuck if this Wood was Sediment: The Effect of *Marmota monax* on the Archaeological Record

Megan Scalzo, Dept. of Anthropology, with Dr. Bernard Means, Dept. of Anthropology

Geomorphology is the study of the topographic effects of different physical, chemical, biological processes occurring along and within the landscape. Biological processes can occur from different faunal influences and subsequently get called geomorphic agents. In the majority of North American woodlands, *Marmota monax* (common names include: groundhog, woodchuck) can be found and thus can be assumed to be geomorphic agents of these woodland areas. In this poster, I will discuss and organize the effects of *Marmota monax* on the archaeological record.

22. The Relationship Between Enslaved Individuals And Plantation Architecture In 18th And 19th Century Virginia

Emma Clark, Depts. of History and Anthropology, with Dr. Bernard K. Means, Dept. of Anthropology

Enslaved labor built the physical environment of 18th and 19th century plantations from slave quarters to plantation houses. These built environments were designed in a way to showcase the stratification between enslavers and the enslaved. An analysis of plantation archaeology on three significant Virginian plantations can reveal two aspects of the relationship between enslaved individuals and plantation architecture. First, it can reveal the physical process of construction (brickmaking, building development). Second, it can reveal the impact of these structures on African American identity (representing their status in society, social grouping). This analysis further highlights the lives of individuals forgotten in the shadow of Virginia's remembered.

23. A Comparison of PTSD, AUD, and MDD Symptom Patterns in Different Trauma Types

Elizabeth Crump, Dept. of Biology, with Dr. Kaitlin Bountress, Virginia Institute of Psychiatric and Behavioral Genetics

About 66% of college students have been exposed to a criterion A trauma (Read et al., 2011). Research thus far suggests that interpersonal trauma (IPT; e.g., physical or sexual abuse or assault) is linked to higher risk of PTSD, variability in symptom clusters, and comorbidities with substance use compared to accidental trauma (e.g., natural disaster, motor vehicle accident). (Kessler et al. 1995; Kelley et al., 2009; Kilpatrick et al. 2000).

There is little research investigating the role of trauma type in the expression of symptoms related to PTSD (both overall and symptom cluster presentation), Alcohol Use Disorder, and Major Depression in a representative college population. The first aim of this study was to investigate the relation between trauma type (interpersonal and accidental trauma) and PTSD, AUD, and Major Depressive symptoms as well as PTSD symptom cluster presentation. We also sought to test in an exploratory manner whether there was an association between these symptoms and increased trauma type count (i.e., experiencing both IPT and accident at trauma). Results found that those with IPT exposure experienced the highest rate of all symptoms (excluding depressive and PTSD reexperiencing) and was significantly greater than the group with both IPT and accidental exposure. The findings suggest that greater intervention measures should be focused on those who experience IPT trauma due to the greater vulnerability to PTSD, Alcohol Use, and Depressive symptoms.

24. Conversations About Race and Perceptions of Racial Discrimination Among Emerging Adults

Alanna Cason, Depts. of Psychology and Criminal Justice, Angel Whitfield, Maria Cisneros, Dept. of Psychology Graduate Student, Arlenis Santana, Dept. of Psychology Graduate Student, & Eryn DeLaney, Dept. of Psychology Graduate Student, with Dr. Chelsea D. Williams, Dr. Tricia Smith, Dr. Amy Adkins, and Dr. Danielle Dick

College students of color have positive race-related experiences (e.g., positive conversations), as well as negative race-related experiences (e.g., racial discrimination and negative experiences about race; Spencer 2006). Limited work has focused on conversations students have about race, although the U.S. has become more diverse especially in college settings (Martinez-Acosta & Favero, 2018). To address these gaps, the current study focused on bidirectional relations between students' conversations about race and how they are related to discrimination experiences among 95 college-age students of color. We hypothesized that (1) more negative conversations about race (and less positive conversations) would increase students' perceptions of racial discrimination, and (2) the more students experienced discrimination, they would have more negative conversations (less positive conversations) about race. Two linear regression analyses were conducted. The first analysis indicated that negative conversations about race ($B = .38, p < .001$), predicts perceptions of racial discrimination among college students. However, when tested in the other direction, perceptions of racial discrimination predicts both negative conversations about race ($B = .40, p < .001$) and positive conversations about race ($B = .25, p = .02$). The discussion will focus on the implications and future directions for conversations about race, racial discrimination, and possible solutions to increase social awareness.

25. A Narrative Review of Interpersonal Trauma, Mental Health, and Substance Use Among LGBTQ College Students

Meagan Nguyen, Dept. of Psychology, Mar'Quelle Winfield, & Eryn DeLaney, Dept. of Psychology Graduate Student, with Dr. Chelsea D. Williams, Dept. of Psychology

College is a critical time for LGBTQ (lesbian, gay, bisexual, queer) individuals due to sexual identity formation and trauma exposure (e.g. Arnett, 2000; Acierno et al., 2001). Studies have shown that heterosexism is manifested on college campuses through discrimination and cultural norms that devalue LGBTQ individuals and perpetuate heterosexuality as normative and superior (Rankin et al., 2010). Additionally, there is a drastic increase in prevalence across different trauma types (e.g., sexual assault), as well as the continuation

of risk behavior and psychological distress, including substance abuse (Oswalt & Wyatt, 2011) during this time period. Using psychinfo to find articles to day, the purpose of this literature review was to examine the literature review and identify gaps in work that has exposed the associations between intimate partner violence (i.e., IPV), childhood sexual abuse, physical assault and sexual assault on mental health and substance use among LGBTQ college students. Findings indicated that the previously mentioned associations exist among LGBTQ+ adults. Discussion will include limitations within these studies, implications and future directions to improve LGBTQ college students' outcomes.

26. Evidence-Based Programs & Measures Of Mental Health Literacy among Adolescents: A Narrative Research Review

Roxana Naemi, Dept. of Psychology, Sabrina Hawa, & Chloe Walker, Dept. of Psychology Graduate Student, with Dr. Chelsea D. Williams, Dept. of Psychology

This current narrative research review aims to provide a review of measures that assess the principles of mental health literacy among adolescents. Mental health literacy can be defined as the degree to which an individual processes and understands mental health information and is able to seek further treatment (Olsson & Kennedy, 2010) and varies based upon age (Farrera et al., 2008), sex differences and relationships with peers (Burns & Rupee 2006), and attitudes towards mental health (Olsson & Kennedy, 2010). Using PsycINFO to find research to date, findings of the review indicated that for evidence-based programs using mental health literacy, adolescents had a better understanding of mental health literacy post-program, whereas when they were first interviewed through surveys and questionnaires. Additionally, the review indicated that more studies assessing psychometrics of existing measures used to assess mental health literacy among adolescents are warranted. Discussion will center on programs and methodological approaches used to examine mental health literacy among adolescents and the need for implementing more programs promoting mental health literacy within schools.

27. Academic Socialization and Its Effects on Academic Success

David Lim, Dept. of Psychology and Maria J. Cisneros-Elias, Dept. of Psychology Graduate Student, with Dr. Chelsea D. Williams, Dept. of Psychology

Academic socialization in education is how parents use their own educational beliefs and expectations to provide messages to their children to help navigate or influence their academic success and development (Hill & Tyson, 2009). There is currently very little research done on academic socialization, and recent studies have just started addressing the lack of research on this subject. This narrative review focuses on parental academic socialization, to understand the influence it has on their child's academic endeavors. Eight peer-reviewed articles on academic socialization were found from Psychinfo for this narrative review. This scoping review explores the literature related specifically to academic socialization to better understand how much of an impact it has on outcomes among different age groups of children, ranging from elementary, middle, and high school. Results of the studies reviewed show that there are positive influences of parental academic socialization such as, increased socio-emotional competencies among kindergarten students (Puccioni et al, 2019) and academic achievement especially among high school students (Hill & Tyson, 2009). Implications to further research academic socialization will be discussed.

28. A Narrative Review of Protective Factors that Predict Enculturation Processes

for Latinx Individuals in the U.S.

Jane Sun, Dept. of Psychology, Jennifer Rodriguez, Alanna Cason, Yessica Flores, Karl Villareal, Arlenis Santana, Dept. of Psychology Graduate Student, & Chloe Walker, Dept. of Psychology Graduate Student, with Dr. Chelsea D. Williams, Dept. of Psychology

According to the 2010 U.S. Census, the rise of immigration led the Latinx community to experience the largest population growth amongst all ethnic-racial groups (Sanchez et al., 2012). Enculturation is the process of preserving heritage cultural values while enduring the influence of the current, surrounding culture (Schwartz et al., 2013). Enculturation is a subcomponent in the broad spectrum of acculturation, the process through which the introduction of two differing cultures induces cultural changes (Rodriguez et al., 2002). While current research has focused on the protective factors involved in the acculturative process, minimal research has centered on the protective factors in enculturation amongst the Latinx community. The aim of the current narrative review was to identify the protective factors (e.g., language, values, generational differences, group membership) associated with enculturation of Latinx U.S. citizens. Implications will discuss the promotion of social awareness within the Latinx community.

29. The Relationship between Anxiety and Depressive Symptoms and Substance Misuse (in Terms of Marijuana, Illicit Drugs, Tobacco, and Alcohol) in College Students

Devin Singh, Depts. of Psychology and Chemistry, with Dr. Sally Kuo and Dr. Amy Adkins, Dept. of Psychology

The prevalence of substance use (in terms of marijuana, illicit drugs, tobacco, and alcohol) in college students is of consistent concern as are rising rates of mental health concerns (i.e., anxiety and depression). College is a critical developmental period for establishing health in young adults. Previous studies have shown that students experienced anxiety and depressive symptoms when they used alcohol, cannabis, tobacco, amphetamines, cocaine, sedatives, and hallucinogens (Walters et al., 2018, & Stowell et al., 2019). The purpose of this study was to look at mental health and substance use in a college sample to determine the relationships between different patterns of use and internalizing symptoms. Data was taken from Spit4Science (Dick et al., 2014) and the analytic sample consisted of the freshman class of Fall 2014 and their follow-up survey in Spring of 2015 at a diverse, urban, public university. The survey covered anxiety and depressive symptoms and substance use. Separate sum scores for anxiety and depressive symptoms were put together by adding up the responses to four questions for anxiety symptoms and four questions for depressive symptoms, taken from the SCL-90 (Derogatis & Cleary, 1977), to get a total score for each. A metavariable substance use group was created based upon lifetime use: Non-Users; Alcohol Only; Alcohol and Nicotine; Alcohol and Marijuana; and Poly-Substance Use of Alcohol, Marijuana, and Illicit Drugs and/or Nicotine. Separate ANOVA tests were run for anxiety and depressive symptoms, and follow up comparisons done with a post-hoc Tukey Test. There was a significant difference in anxiety symptoms [$F(4, 1320) = 3.983, p = 0.015$] and depressive symptoms [$F(4, 1321) = 7.698, p = 0.020$] between the Polysubstance group and Alcohol Only group. The Polysubstance group had higher rates of symptoms. These results highlight potential detrimental emotional and behavioral health effects for polysubstance users.

30. Figuring Out the Aztecs

Milla Gardiola, Dept. of Sociology, with Dr. Bernard Means, Dept. of Anthropology

This project looks at various Mesoamerican artwork with a strong focus on Aztec figurines and sculptures. I take a closer look at the meaning behind the figurines and their importance to Aztec cultures. With religion being an important aspect in Mesoamerican culture, I explore a few Aztec deities and explain who they are and how they are worshiped in their everyday life. There is also a section of this project dedicated to modern figurines and sculptures with the intention to show the relation between the past and modern cultures.

31. Thrombolytics in Pediatric Stroke: Imaging Modalities

Katherine Au, Dept. of Biomedical Engineering, with Dr. Bisi Hollist, Inova Neuroscience and Spine Institute

We report the potential danger associated with an initial neuroimaging-negative cerebral ischemia in pediatrics. For patients who present with clinical features suggestive of acute ischemic stroke but have an alternative diagnosis, there is concern of utilizing thrombolysis. Due to the short time window from symptom onset to treatment, a thorough history and neurologic examination, along with diagnostic imaging and blood tests are important for diagnosis and timely treatment. We present a case of a 14-year old female with a history of thalamic stroke who presented with neurological symptoms consistent with acute stroke. An MRI of her brain was indeterminate and showed no frank evidence of cerebral infarction. Further inspection showed an area of restricted diffusion which clinically correlated to her symptoms. There was no evidence of vessel wall irregularities, high grade stenosis or dissection. This patient was administered intravenous tPA over the course of 1 hour and her symptoms resolved.

32. Characterizing e-cigarette Use among Virginia Middle and High School Youth Using Confiscated Products

Sohee Ha, Dept. of Psychology, Cindy Miranda, Dept. of Psychology, & Alisha Eversole, Dept. of Psychology Graduate Student, with Dr. Caroline O. Cobb, Dept. of Psychology

Introduction: There has been heightened research interest on JUUL use among youth, but less information is available on the use of other electronic cigarette (e-cig) brands, like NJOY or Smok. Other than self-report, methods such as collection of confiscated e-cigs may provide an unbiased estimate of youth e-cig use behavior. This study aims to characterize e-cig use using confiscated products among middle and high school youth to inform prevention and intervention efforts. **Methods:** Confiscated e-cig products (N=62) were collected from Central Virginia public school districts during September 2019 - December 2019. Products were placed in a ziplock bag with a form completed by school personnel that included date, grade level, and possible side effects. Form details, product characteristics, and presence of tampering were recorded using a standardized instrument and double-data entry method. Data was analyzed using descriptive and bivariate statistics with SPSS V26. **Results:** E-cig device + liquid reservoir (i.e., a pod) comprised a majority of products confiscated (77.4%) followed by e-cig liquid only (17.7%) and e-cig device only (4.8%). The top two brands were NJOY Ace (40.3%) and JUUL (24.2%). Grades with the most confiscated products were 11th (30.6%), 8th (19.4%), and 9th (17.7%). Suspected tampering was present in about one-third of products. Middle school students (MSS; grades 6-8; n=15) preferred JUUL (n=8, 53%) while high school students (HSS; grades 9-12; n=39) preferred NJOY Ace (n=20, 51%). Blueberry and watermelon twist NJOY Ace flavors were

common among HSS. **Discussion:** Pod mod brands other than JUUL were common among confiscated products. HSS appeared to prefer fruit flavored NJOY Ace pods, while MSS used JUUL (only available in tobacco/menthol flavor during data collection). HSS may prefer NJOY Ace due to available flavors, more mL per pod, and lower cost. Findings emphasize the need for greater restrictions and youth access controls for e-cigs. Current policies for age and pod mod flavors may not be sufficient to deter youth use.

33. Sex Differences in Skin Tone Predicting Depressive Symptoms among College Students of Color

Jenifer Rodriguez, Jenna Minter, Depts. of Psychology and Political Science, Eryn DeLaney, Dept. of Psychology Graduate Student, & Chloe Walker, Dept. of Psychology Graduate Student, with Dr. Chelsea D. Williams, Dr. Amy Adkins, Dr. Tricia Smith, & Dr. Danielle Dick, Dept. of Psychology

Skin tone, or more specifically the meaning and treatment that society attaches to skin tone, has been found to impact individuals' outcomes, with those with darker skin tones (who experience more colorism) experiencing more negative outcomes (e.g., Norwood, 2014). However, less research has tested whether there are sex differences in these relations. Intersectionality theory (Crenshaw, 1989) suggests that one's lived experiences result from their holistic experiences of intersecting aspects of themselves (e.g., skin tone and sex). Thus, to address gaps in research, the current study examined sex as a moderating variable in the relation between skin tone and depressive symptoms among 81 college students of color who were part of a larger study on cultural experiences, genetics, and ancestry. We hypothesized that sex would moderate this relation, such that skin tone would predict greater depressive symptoms, and this association would be weaker among males compared to females (Hunter, 2007). A linear regression was conducted to test our hypothesis. Findings indicated that sex moderates the relation between skin tone and depressive symptoms, however, in a direction contrary to our hypothesis. In particular, there was no relation between skin tone and depressive symptoms among females ($B = .08$, $p = .54$), however, for males, those with darker skin tones had lower depressive symptoms ($B = -.53$, $p = .02$). In conclusion, this study pushes for more research on the sex differences in how skin tone affects mental health among college students.

34. Mapping New Olfactory Bulb Neurons at the Single-Cell Level Using Iron Oxide-Assisted MRI

Sarah Izabel, Dept. of Biology, with Dr. Jeffrey Dupree, Dept. of Anatomy and Neurobiology

Neurogenesis in the subventricular zone (SVZ) of adult mammalian brains persists throughout life. Precursor cells that are continuously born in the SVZ migrate long-distance to the olfactory bulb (OB), where they differentiate into specific neurons. The distribution of new neurons in the OB has been studied via histological and intravital techniques, which are limited longitudinally and in depth of imaging. In the past decade, in vivo studies using magnetic resonance imaging (MRI) have shown the possibility of detecting single cells and tracking new neurons in the OB, where precursor cells can be labelled using iron oxide. In this study, neural progenitor cells in the SVZ were labeled using micro-sized iron oxide particles (MPIOs) and their migration to the OB was detected with MRI. MPIO was confirmed to be present in new neurons via immunohistochemistry and MRI signals were overlapped with MPIOs showing that MPIO-generated MRI contrast can be used to detect single neuronal cells in the OB.

35. Molecular Mechanisms of the DYRK1A-regulated DNA Repair

Polina Bukina, Dept. of Biology, with Dr. Sarah Golding, Dept. of Biology

The functions of human Dual-specificity tyrosine (Y)-Regulated Kinase 1A, or DYRK1A, include cell cycle control and differentiation. DYRK1A is required for assembly of the DREAM complex and repression of the cell cycle-dependent genes, such as BRCA1 and RAD51, in quiescence. Our lab previously reported that overexpression of DYRK1A inhibits the accumulation of a DNA repair protein 53BP1, at the DNA double-stranded breaks (DSB). Accumulation of 53BP1 is attributed to repair by non-homologous end joining (NHEJ) over homologous recombination (HRR). The function of 53BP1 is opposed by RNF169, a ubiquitin-binding protein that also accumulates at the DSB sites and promotes HRR. It was found that DYRK1A interacts with RNF169 to regulate the displacement of 53BP1 from the DSB sites. This study focuses on RNF169 in order to understand the role of DYRK1A in DNA damage response. We used the Multi-Dimensional Protein Identification Technology (MudPIT) proteomic analysis to identify RNF169-interacting proteins. Human cancer U-2 OS cells stably expressing HA-tagged RNF169, as well as control cells were used for immunoprecipitation. The samples were sent to Stowers Institute for Medical Research for MudPIT proteomic analysis. In order to understand the regulation of DNA repair by DYRK1A, the RNA sequencing dataset was analyzed as part of other studies in the lab. The expression of the mRNA for repair factors RAD51 and BRCA1 was found to be regulated by DYRK1A. To determine the significance of this finding, an experiment was designed to assess BRCA1 and RAD51 protein levels in the normal U-2 OS cells and in the cells lacking DYRK1A (U-2 OS DYRK1A knockout cells) after inducing DNA damage by gamma irradiation. It was found that the levels of RAD51, BRCA1 and 53BP1 levels were increased with DYRK1A KO. These results were consistent with the finding that DNA repair efficiency is increased with DYRK1A KO. Further studies can help to understand if these effects are mediated by DYRK1A-regulated DREAM complex.

36. Autobiographical Storytelling in English Language Arts Instruction: Fostering Literacy and Social Emotional Development in the Elementary English Language Learner Classroom

Elysia Lin, with Prof. Mary Boyes, VCU Honors College

Given the changing cultural and linguistic profile of the United States classroom, culturally relevant teaching strategies that address individual learning needs and establish meaningful learning contexts have become increasingly important for student success. The integration of autobiographical student narratives into traditional English language instruction via storytelling represents a promising area of educational research. The present study sought to investigate the extent to which storytelling facilitates inclusivity, fosters positive social-emotional development, enhances engagement, and contributes to gains in academic performance of elementary-aged English language learner (ELL) students. In a comprehensive literature review, this study explored storytelling in relation to classroom demographic profiles, literacy development, dynamics of interpersonal relationships, and mechanisms of student engagement and motivation. Storytelling in promoting language achievement and social-emotional development was evaluated through the lens of Gardner's social educational model of second language acquisition. Research found that fewer opportunities for open dialogue within diverse classrooms contribute to negative cultural stereotypes. Storytelling supports the social-emotional development of students by broadening cultural attitudes and affirming both peer-to-peer and student-

teacher relationships. Storytelling, compared to traditional instruction, better incorporates multimodal literacy skills into language. Additionally, storytelling increases student engagement by creating a meaningful learning context, which in turn heightens motivation and mediates positive academic outcomes. Four guidelines for storytelling-based language instruction in diverse classrooms emerged: (1) acknowledgement and acceptance of diverse cultural and linguistic backgrounds, (2) legitimization of student experience and student voice, (3) implementation of scaffolding techniques by teacher-storytellers, and (4) support of active student roles in learning.

37. Analysis of the Role of Aminoacyl tRNA Synthetase Genes in Global Protein Synthesis and mRNA Specific Regulation of Translation in Cancer Cells

Elyse Nguyen, Depts. of Biology and Chemistry, Dipak Poria, & Esta Sterneck, with Dr. Sarah Williams, Dept. of Forensic Science

Coordinated control of transcription and translation of gene expression impels cellular fate decision under different microenvironmental stresses. Cancer cells often usurp these regulatory machineries to adapt under microenvironmental stress or under therapeutic intervention. The transcription factor CEBP δ is induced by various stressors and mediates cellular adaptation and survival. RNA-seq analysis of a CEBPD-silenced human melanoma cell line, MB-435s, showed decreased expression of 12 aminoacyl-tRNA synthetase (aaRS) genes. Our group recently found that deletion of CEBPD by CRISPR/Cas9 (CEBPD-KO) compromised aminoacyl tRNA synthetase (aaRS) expression and global protein synthesis. However, despite this decrease in global protein production, the synthesis of certain proteins, such as ATF4, which promotes survival and/or death under stress conditions, is increased. Aminoacyl tRNA synthetases are essential enzymes in the process of protein synthesis which catalyze the addition of appropriate amino acid to its corresponding tRNA, and therefore act as a rate limiting step in cellular protein synthesis. In the current project, we sought to investigate the effect of silencing of specific aaRS genes, glutamyl-prolyl-tRNA synthetase (EPRS) and valyl-tRNA synthetase (VARS) on global protein translation and ATF4 expression. To address this question, we silenced the EPRS and VARS gene expression using two independent short-hairpin-RNA (shRNA) targeting two different regions of EPRS and VARS mRNAs in MB-435s cells. Silencing of EPRS gene showed compensatory upregulation of VARS and vice versa. Interestingly, our preliminary data suggested an upregulation of global protein synthesis after EPRS and VARS silencing in MB435s cells measured by puromycin pulse labelling. Ongoing experiments to validate the preliminary data and ATF4 expression will be discussed.

38. The Induction of Macrophage Endoplasmic Reticulum Stress by Irradiated-Tumor Derived Extracellular Vesicles Supports the Adoption of a Pro-Tumor Phenotype

Sitara Mahmoodi, Depts. of Biology and Chemistry, with Dr. Sarah Golding, Dept. of Biology

Recent studies have shown that long term exposure of tumor cells to sub-lethal levels of endoplasmic reticulum (ER) stress leads to the suppression of anti-tumor immunity through the manipulation of myeloid cells in the tumor microenvironment.¹ While this effect seems to be dependent upon the ability of cancer cells to “transfer” the state of ER stress to myeloid cells, i.e. to initiate ER stress signaling in myeloid cells independent of the original stimulus, exactly how stressed cancer cells accomplish this is still not well understood¹. Our focus is on exosomes which are extracellular vesicles and how they play a significant role in this mechanism. In recent studies, we demonstrated how extracellular vesicles

secreted by irradiated melanoma cancer cells (IR-EVs) induce ER stress in Bone Marrow Dendritic Cells (BMDCs). In addition, BMDCs treated with IR-EVs demonstrated enhanced STAT3 and p38 signaling, two related pathways that have been demonstrated to induce tolerogenic DC phenotypes, in an ER stress dependent manner². We have also found that IR- EVs stimulate the production of IL-10, a major negative regulator of antitumor immunity, from BMDCs and that this expression can be eliminated by STAT3 inhibition². However, using a T-Cell Receptor/ tumor- associated antigen (TCR/TAA) system to model the interaction between BMDCs and cytotoxic T cells from a tumor rejection antigen (Pmel/gp100), we have observed that pharmaceutical ER stress or STAT3 inhibition dramatically inhibits T cell proliferation and IFN-gamma expression in response to antigen pulsed BMDCs. This suggests that ER stress and STAT3 signaling are both necessary for the presentation of tumor antigens to cytotoxic T cells, indicating that inhibition of these pathways would not be a desirable approach to enhance antitumor immunity in vivo. Thus, our current focus is on finding a way to inhibit the production or activity of these IR-EVs directly, inhibiting their effects on DCs in the body while leaving STAT3 signaling in proliferating T cells unaltered.

39. Bullet Wound Amputation

Laura Flaherty, Depts. of Anthropology and History, with Dr. Bernard Means, Dept. of Anthropology

"The limbs of soldiers are in as much danger from the ardor of young surgeons as from the missiles of the enemy."

-Surgeon Julian John Chisholm, 1864

Civil War medicine was highly dependent on the profession and education of those practicing medicine on the battlefield. Throughout the states that were involved with the war are burial grounds of soldiers or partial remains post amputation. Are there indicators of differing probabilities of survival of amputees at field hospitals or (traditional) established hospitals? Were soldiers more likely to live through amputations only to later die from infection? The factors under consideration are: capabilities of surgeons and staff at the types of treatment locations, hygiene, infection, available treatment material, potential transfers from field to established hospitals, treatments, and the later disposal of limbs.

40. Combination Therapies of Guadecitabine and Immune Checkpoint Inhibitors in a Murine Triple-Negative Breast Cancer Model

Jamie-Jean Gilmer, Depts. of Biology and Chemistry, with Dr. Sarah Golding, Dept. of Biology

Triple-negative breast cancer (negative for estrogen and progesterone receptors and HER-2) currently carries a poor prognosis, and new treatment regimens are highly sought after. In this study, we investigated the efficacy of a next-generation DNA methyltransferase inhibitor, guadecitabine, alone and in combination with other agents for treating the murine E0771 medullary breast adenocarcinoma model. In vitro, we combined guadecitabine with trametinib, a MEK1/2 inhibitor, and observed suppressed E0771 tumor cell growth and a marked increase in MHC class I and PD-L1 expression. In vivo, we

combined guadecitabine with immune checkpoint inhibitors, anti-PD-1 or anti-PD-L1, and the taxane, paclitaxel. Treatment with guadecitabine, paclitaxel, and anti-PD-1/L1 demonstrated effective inhibition of tumor growth, and treatment with guadecitabine, paclitaxel, and anti-PD-1 produced a moderate cure rate. Additionally, we investigated the effect of early vs delayed treatment in vivo with guadecitabine, especially when combined with anti-PD-1. We found that early treatment using guadecitabine showed significant initial tumor suppression in vivo, but tumor growth recovered soon after treatment ceased. Lastly, we studied the effects of guadecitabine on E0771 tumors in vivo when used in combination with adoptive cellular therapy (ACT) with tumor-sensitized T lymphocytes, and we found the combination to be highly effective, with a high cure rate.

41. Basalt Leaching in Rapa Nui (Easter Island) Rock Gardens Favours Agricultural Surplus Production

Elisabeth Burns, Depts. of Anthropology and Gender, Sexuality, & Women's Studies, with Dr. Christopher Stevenson, Dept. of Anthropology

In an effort to provide evidential support for the process of basaltic mineral dissolution replenishing soil fertility and enabling productive plant growth in Rapa Nui rock gardens, a simulated leaching experiment was conducted to determine the elemental release rates from the basalt matrix, and the availability of these elements for plant absorption. The dissolution experiment modeled Rapa Nui soil conditions and rainwater with a pH of 6.3. Basalt leaching was accelerated at elevated temperatures (50-90°C) for 44.8 days. The results indicated that calcium and magnesium were preferentially leached even with a short-term exposure. These data support an earlier observation of calcium enhancement in rock gardens above levels of natural fertility in non-garden soils. Ultimately, it is of interest to determine if soil nutrient enrichment through basalt leaching was enough to increase crop surplus and facilitate the construction of megalithic architecture.

42. Language Skills of Children and Youth with Schizophrenia: A Meta-Analysis

Laura Griffith, Depts. of Psychology, Criminal Justice, & History, with Dr. Jason Chow, VCU School of Education

Schizophrenia is a severe psychological disorder that remains difficult to understand. Since the presentation of the disorder can vary widely from person to person, there is much debate about the exact nature and cause of the disorder. Some researchers and clinicians prioritize certain symptoms above others, leading to multiple viewpoints on exactly what type of disorder schizophrenia is. In spite of these differences, one commonality among many researchers is the hope to find answers and possibly interventions and treatments by studying the prodromal phase of the disease. Additionally, there has been growing interest in childhood-onset schizophrenia, which does not always receive as much attention as its more common adult-onset counterpart. Cognitive deficits, including problems with language development, appear to be common among youths at clinical high risk (CHR) for or diagnosed with schizophrenia. Thus, the purpose of this meta-analysis was to examine the language skills of children with childhood-onset schizophrenia or children who are CHR. The present systematic review and meta-analysis included quantitative studies that report language skills of either childhood-onset schizophrenia patients or CHR participants under the age of 18. We included studies that reported data from expressive, receptive, and pragmatic language assessments. We excluded studies if the participant samples included individuals with comorbid disorders, such as autism spectrum disorder. We obtained articles from an iterative search process of PubMed, ProQuest Dissertations and Theses,

and PsycINFO databases. We used random-effects meta-analysis to estimate the average core language scores of early-onset schizophrenia and CHR children and youth. We applied robust-variance estimation to account for within-study dependency. We also explored the extent that child-level factors as well as type of language measure predicted language scores. After a comprehensive and systematic review of the literature, the present study includes data from 23 reports. Preliminary analyses suggest that language scores in this sample are significantly lower than typical children. The broader goal of this meta-analysis is to determine the patterns of language development in CHR children and children with schizophrenia, as well as to determine if any language disorders could be predictive of patient prognosis. Identifying risk factors and early warning signs of schizophrenia is crucial to providing the most effective treatment possible. Also, understanding common cognitive symptoms in children who have already been diagnosed can help clinicians to create more tailored treatment plans to alleviate all aspects of the disorder.

43. BPTF Enhances Chemotherapy Induced Cytotoxicity

Valentina Posada, Depts. of Biology, Chemistry, & Religious Studies, with Dr. Joseph Landry, Dept. of Human Molecular Genetics

New chemotherapies and immunotherapy treatments have greatly improved the outcomes of many cancers. However, for Triple Negative Breast Cancer (TNBC), existing therapies are not very effective long term as the disease becomes resistant and has low immunogenicity. Here we show the early development of a new way to treat the disease by combining existing chemotherapies with depletion of the Nucleosome Remodeling Factor (NURF). NURF is an ATP-dependent chromatin remodeling complex that is over-expressed in cancers and has shown to inhibit the anti-tumor immune response. The largest and essential subunit of the complex, BPTF is required for function. BPTF shRNA-mediated knockdown (KD) was done as a way to deplete cells of NURF. Our first aim was to determine if BPTF-KD cells showed enhanced sensitization to chemotherapies most prominently Doxorubicin. The results from completing this aim showed sensitization to several chemotherapies which correlated with enhanced therapy-induced autophagy. Our second aim was then to investigate the role of autophagy in the sensitization of BPTF-KD cells to chemotherapies. Autophagy is a process by which cells undergoing stress consume their cellular components. This process is mediated in part by the ATG5 protein. ATG5 KD was done through lentivirus transfection, and in turn, functional blockade of autophagy was achieved as confirmed by Western blotting. Results showed that BPTF-KD cells did not have enhanced sensitivity to Doxorubicin through the blockade of autophagy, which suggested a non-protective role in autophagy, while the BPTF-WT cells that had autophagy blocked did show an enhanced sensitization, suggesting a cytoprotective role. Aims were then tested in vivo to determine the role of autophagy in BPTF-KD cells in vivo. BPTF-KD and ATG5-KD 4T1 cells were transplanted into mice and tumor volume over time was measured. Syngeneic mouse models showed that the BPTF-KD tumors had significantly smaller tumor volumes than the control when treated with Doxorubicin, and therefore showed sensitization to Doxorubicin. Results for the ATG5 KD mice show tumors growing better in the WT while growing worse in the KD1/ KD2 mice suggesting that autophagy is required for sensitization of BPTF-KD tumors to Doxorubicin in vivo. The third aim of the project was to determine the possible immune-modulatory consequences of treating BPTF KD cells with chemotherapies. Natural Killer (NK) cells were depleted in mice to see if there would be a change in the sensitization to therapies. Results showed that once we depleted NK cells in mice with a mAb-depletion strategy, the sensitization to Doxorubicin was lost. Furthermore, a metabolomics screening was conducted and reductions in prostaglandin E2

(PGE2) were discovered in the therapy treated BPTF-KD cells. PGE2 is a well known immune suppressive metabolite produced by tumor cells to suppress the anti-tumor immune response. Further results showed PGE2 reductions when autophagy was blocked by ATG5 KD in the BPTF-KD cells. This result could explain the improvements in tumor growth within the mice since PGE2 is a known NK cell inhibitor. Together, these results suggest that NURF could be a therapeutic target for enhancing clinical outcomes in Triple Negative Breast Cancer Patients.

44. Mental Health Comorbidities in Adolescents with ASD: Indirect Effects of Family Functioning through Youth Social Competence

Marie Johnson, Depts. of Psychology and Product Innovation, and Jessica Greenlee and Cathryn Richmond, Dept. of Psychology Graduate Students, with Dr. Marcia Winter, Dept. of Psychology

Recent research has established the high comorbidities of mental health problems in adolescents with Autism Spectrum Disorder (ASD; see Strang, et al., 2012), prompting researchers to examine factors that may contribute to elevated anxiety and depression. Given the centrality during adolescence of both the family and peer contexts (Greenlee, Winter, & Diehl, 2018) as well as the stage salience of peer relationships (Masten et al., 1995), this study focused on family functioning, social competence, and mental health in verbally-fluent adolescents with ASD. Some have suggested that adolescents with ASD who have no cognitive impairment are more interested in social interaction but also more aware of their social differences (Mazurek & Kanne, 2010). Combined with the social demands of adolescence, increased social awareness may put youth at risk for disengaging from peers; poor peer relationships, feelings of isolation, and loneliness have been associated with internalizing problems in youth with ASD (Bauminger & Kasari, 2000; Vickerstaff et al., 2007; Whitehouse et al., 2009). We reasoned that adolescents learn social skills in part from family experiences, even in the context of ASD, and that the family environment plays a role in adolescent's social competence. Thus, while social-communication deficits are an inherent part of an ASD diagnosis, families still play a role in adolescents' social competencies and influence their social development. Therefore, we tested part of the larger theoretical model by examining the indirect relationship between family functioning and adolescent anxiety and depression symptomatology via adolescent social competence for adolescents with ASD.

This study uses data from the Teens and Parents (TAP) Study (see Greenlee, 2019). Participants were adolescents aged 13-17 ($N = 178$; $M_{\text{age}} = 14.92$, $SD = 1.31$; 73% male) diagnosed with ASD, and their primary caregivers (PCs) who all identified as biological or adoptive mothers. PCs reported demographics and completed (1) the Self-Report of Family Inventory (SFI; Beavers & Hampston, 2000) to assess global family functioning via the Health and Competence subscale, and (2) the Social Responsiveness Scale (SRS; Constantino & Gruber, 2012) to assess deficits in adolescent social competencies. Adolescents reported their own depression and anxiety symptoms via the Revised Children's Anxiety and Depression Scale-Short Version (RCADS; Ebesutani et al., 2012).

As shown in Figures 1 and 2, the indirect pathway from family functioning to social competence deficits and in turn to internalizing symptoms was statistically significant for adolescent anxiety ($B = -1.015$, $SE = 0.394$, 95% $CI = [-1.893, -0.353]$) and depression symptoms ($B = -0.513$, $SE = 0.192$, 95% $CI = [-0.938, -0.189]$) over and above the effects of family SES and adolescent age, sex, and restrictive and repetitive behavior. It was proposed

that family functioning would play a role in adolescent mental health symptomatology via the mediating effect of social competence. Results support this hypothesis, indicating the importance of family functioning in youth social competence, and the subsequent effects on adolescent mental health. These results contribute to the understanding of mental health comorbidities in adolescents with ASD and could be used to inform future interventions.

45. The Role of Gendered Racial Microaggressions on African American Women's Sleep Quality

Shanya Chandel, Depts. of Psychology and Human Resource Management, and Ashlynn Bell and Chelsie Dunn, Dept. of Psychology Graduate Students, with Dr. Kristina Hood, Dept. of Psychology

African American women are often subjected to oppressive and marginalizing commentary directed toward various facet of their being. This subtle yet harmful oppressive commentary is commonly referred to as silencing and marginalizing gendered racial microaggressions (Lewis & Neville, 2015). These types of microaggressions can be expressed by silencing, meaning taking away the voices of others. Microaggressions can also be used to marginalize individuals in regard to physical appearance, stereotypes about behavior, and even sexually objectifying messages. While the deleterious effects (e.g., mental health, sleep quality) of the more overt workplace and academic discrimination have been previously established; little is known about the subtle, pervasive forms of discrimination (Whitaker, 2019). It is important to explore one's sleep quality as adequate sleep allows for critical cognition, or the ability to think clearly, be alert, and sustain attention (Worley, 2018) – aspects essential for good workplace and academic performance. Previous work has established the link between discriminatory experiences and the sleep quality of African American adults (Fuller-Rowell et al., 2017; Owens et al., 2017). Additionally, frequent exposure to microaggressions can impact African American women's bodily functioning, such as their sleep quality (Lewis, Williams, Peppers & Gadson, 2017). However, little to no research has examined the potential effects of silencing and marginalizing experiences on African American women, who experience a unique combination of racism and sexism in the workplace, school, or other professional settings. The present study sought to examine the moderating role of frequency of silencing and marginalizing gendered racial microaggressions (GRM) on the link between GRM stress appraisal and sleep quality due to discriminatory events after controlling for gendered racial socialization, sleep patterns, silencing behaviors, ethnic identity, and self-worth contingencies. The current study consisted of 229 Black/African American women between the ages of 18 and 55 ($M=33.30, SD=8.49$). Majority of the sample was employed (87%) and about 27% were enrolled in a two- or four-year university. Participants were recruited from Amazon Mechanical Turk and completed questions assessing their sleep quality due to discrimination, stress appraisal and experiences of GRM, ethnic identity, self-worth contingencies, and demographics.

The moderation model was assessed via the PROCESS macro (Hayes, 2018) within SPSS v.26 using 5,000 bootstrapped samples. Moderation analysis revealed a statistically significant interaction between GRM frequency and stress appraisal on sleep quality due to discrimination, $b=.05$, $SE=.02$, 95% CI [.00, .10], $p=.05$. To interpret the statistically significant moderation effect, we used Hayes's PROCESS v.3 (2017) Johnson-Neyman and bootstrap analysis. Findings revealed that GRM frequency is a significant moderator of the link between GRM stress appraisal and sleep quality due to discrimination at both higher ($b=.25$, $SE=.05$, 95% CI [.14, .36], $p=.00$) and lower ($b=.12$, $SE=.05$, 95% CI [.02, .23],

$p=.02$) frequencies. More specifically, among those who higher frequency of GRM events, those who reported greater stress appraisal of GRM events reported poor sleep quality due to discrimination compared to those with lower stress appraisal. This positive relationship was also true for those who reported lower frequency of GRM events. Findings could potentially enhance existing mental health interventions by increasing awareness of how silencing and marginalizing experiences at work or school impact sleep quality among African American women.

46. Role of Self-Worth Contingencies on Sleep Quality Due to Discrimination and Depressive Symptoms

Victoria Cambar, Depts. of Psychology and Criminal Justice, Ruth Laryea, and Bianca Owens and Chelsie Dunn, Dept. of Psychology Graduate Students, with Dr. Kristina Hood, Dept. of Psychology

Scholars have well documented the association on discrimination experiences, negative implications for both physical and psychological symptoms (Gee et al., 2007; Williams et al., 2008). According to Stone and Carlisle (2018), the experience of racial discrimination at the workplace may increase the likelihood of negative emotions and sadness. In addition, the occurrence of perceived discrimination experienced by African American undergrad students in college settings has been associated with psychological and emotional problems including depression (Chao, Mallinckrodt, & Wei, 2012). Subtle forms of discrimination in both the school and the workplace are predictors of negative physical health conditions like low energy levels and fatigue (Nadal et al., 2017). A notable variable that may play an influential role in the relationship between discrimination and depressive symptoms is one's self-worth; but more specifically their self-worth contingencies. Such that, self-worth may also play a role in the link between discrimination and depression. Orth and Robins (2013) suggest that individuals with low self-esteem/worth are more likely to feel sad, lonely, and dejected. Contingent self-worth, the fluctuation of one's self-worth in response to positive or negative experiences including the perceived approval or lack thereof of peers, has also shown to be a vulnerability factor for depression and depressive symptoms (Crocker & Knight, 2005; Crocker et al., 2003). According to Zahn and colleagues (2015) low self-worth and feelings of worthlessness, often appear to occur consistently with lack of energy. Therefore, the present study sought to examine the moderating role of contingent self-worth (i.e., others' approval) on the link between experiences of discrimination at work or school and depressive symptoms after controlling for age, frequency of gendered racial discriminatory experiences, and gendered racial socializations. The current study consisted of 206 Black/African American women between the ages of 18 and 55 ($M=33.24$, $SD=8.46$). Majority of the sample was employed (97%) and about 30% were enrolled in a two- or four-year university. Participants were recruited from Amazon Mechanical Turk and completed questions assessing their sleep quality due to discrimination, depressive symptoms (i.e., energy and emotion levels), and self-worth contingencies (i.e., self-worth based on others' approval).

The moderation model was assessed via the PROCESS macro (Hayes, 2017) within SPSS v.26 using 5,000 bootstrapped samples. Moderation analysis revealed a statistically significant interaction between sleep quality due to discrimination and others' approval-contingent self-worth on depressive symptoms (i.e., energy and emotions), $b=-.07$, $SE=.04$, 95% CI $[-.14, -.01]$, $p=.04$. To interpret the statistically significant moderation effect, we used Hayes's PROCESS v.3 (2017) Johnson-Neyman and bootstrap analysis. Findings revealed that others' approval-contingent self-worth is a significant moderator of the link

between sleep quality due to discrimination and depressive symptoms at higher levels of self-worth contingencies only ($b = -.20, SE = .07, 95\% \text{ CI } [-.33, -.06], p = .00$). More specifically, among those with higher self-worth contingencies, those who reported poor sleep quality due to discrimination reported greater depressive symptoms compared to those with better sleep quality. Findings could potentially enhance existing mental health interventions by increasing awareness of how discriminatory events impact sleep quality and depressive symptoms.

47. Ethnic-Racial Identity and Social Outcomes in Childhood: A Research Review

Grace Bryan, Dept. of Sculpture, Keyri Hernandez, and Chloe Walker and Eryn DeLaney, Dept. of Psychology Graduate Students, with Dr. Chelsea Williams, Dept. of Psychology

Ethnic-racial Identity (ERI) is the labeling, identification, and processing regarding ethnicity-race that takes place during childhood (Umaña-Taylor, 2014). Development of ERI begins as early as 4 years (Derlan et al., 2017), and may have implications for social outcomes, such as prosocial and externalizing behaviors. The aim of the current narrative review was to review research that has tested how ERI is associated with social outcomes, and identify gaps in this field. The results of the narrative review suggest that, in adolescence, higher ERI is associated with better social outcomes, such as prosocial behaviors (Armenta et al 2011; Streit et al 2020). Further, findings of the review indicated that limited work has included individuals younger than adolescents; one study that did find that lower ERI was linked with more externalizing problem behaviors (Smith et al., 2009). The review also highlighted various gaps in this literature, such as that an operational definition of prosocial behavior in the context of ERI needs to be established, and there is a lack of research that includes multiracial individuals, and individuals younger than adolescents. Future research should investigate ERI and social outcomes in childhood with diverse samples, as such research may provide important information to school systems, counselors, and caregivers about the development of ERI and its implications for development.

48. Effect of Political Ideology, Femininity, and Gender on Abortion Stigma

Rym Yousfi, Dept. of Psychology, Emily Beatty, and Allison Patev and Chelsie Dunn, Dept. of Psychology Graduate Students, with Dr. Kristina Hood, Dept. of Psychology

Abortion stigma is a negative characteristic attributed to individuals who terminate a pregnancy that marks them as inferior to social ideals of womanhood (Kumar et al, 2009). One factor influencing abortion stigma is political ideology. Conservative individuals display more opposition to abortion and hold more abortion stigmatizing attitudes, when compared to their liberal counterparts (Bessett et al, 2015). Further, individuals' gender may impact endorsement of these stigmatizing attitudes towards individuals who have had an abortion. Women have less stigma likely due to the fact that they could need to have an abortion (Patev, Hood, & Hall, 2019). Although gender seems to predict abortion stigma, it is unclear how individuals' endorsement of traditional feminine characteristics may relate to abortion stigma, independent of gender. Abortion violates fundamental entities of womanhood, such as being a nurturing mother and being sexually pure (Kumar et al, 2009). Feminine ideals indicate that women should not have control over their own reproduction and sexuality, leading to increased stigmatizing attitudes towards women who have an abortion (Norris et al, 2011). Therefore, the endorsement of traditional feminine ideals may lead to increased abortion stigma, regardless of political ideology or gender. Limited study has examined the relationship between feminine characteristics and abortion stigma. Better understanding

abortion stigma is essential; as, research has shown that stigmatizing attitudes can greatly affect the health of individuals who have had an abortion (Major & Gramzow, 1999; O'Donnell et al., 2018). The current study sought to determine the effect of femininity on abortion stigmatizing attitudes, beyond the effects of political ideology and gender. We initially projected that individuals with more traditional feminine values would hold more abortion stigma.

Participants (N= 305) were recruited via Amazon Mechanical Turk and completed an online survey. The survey included the Stigmatizing Attitudes, Beliefs, and Actions Scale (Shellenberg et al., 2014) to assess abortion stigma, the Personal Attributes Questionnaire (Spence et al., 1974) to assess femininity, one item assessing gender (i.e., men coded as 1 and women coded as 2), and one item assessing political ideology (e.g., lower scores indicate conservative ideology). A hierarchical regression was conducted to determine how individuals' femininity impacts abortion stigma, beyond the effects of gender and political ideology. Political ideology was entered in the first step, and was significant, $b = -.54$, $SE = .28$, $p < .001$, with more of a conservative ideology related to increased abortion stigma. Political ideology accounted for 29.1% of the variability in abortion stigma. Gender was entered in the second step, controlling for political ideology, and was found to be significant, $b = -.11$, $SE = 1.29$, $p = .03$, with women holding less stigma than men. Gender accounted for an additional 1.1% of the variability in abortion stigma, beyond the effects of political ideology. Finally, femininity was added into the third step, controlling for gender and political ideology, and significantly predicted abortion stigma, $b = -.11$, $SE = .16$, $p = .03$, and accounted for an additional 1.0% of the variance in abortion stigma. However, this finding was not in the predicted direction. We found a negative relationship, indicating that individuals with more femininity held less abortion stigma. This is counter to our original prediction, where we projected that individuals with more traditional feminine characteristics would hold more abortion stigma.

These findings extend on previous work determining factors that predict abortion stigma. Having a better understanding of these factors combined influence will aid in decreasing abortion stigma. These results could help to create educational programs on sexual and reproductive health that can reduce abortion stigma and bias, and ultimately could lead to reducing negative health outcomes for individuals who have had an abortion.

49. The Use of Physician Assistants for Health and Wellness in Aging Populations

Desiree Longmire, Depts. of Kinesiology and Health Science, Biology, & Chemistry, with Dr. Christine Booker, Dept. of Kinesiology and Health Science

I conducted a study to expand my research on the demographics of Physician Assistant (PA) programs and how the programs can benefit from having Gerontology in their curriculum. I was able to record data on an excel spreadsheet on the demographics and pass rate scores of PA program graduates. This data was used to assess if PA programs have Gerontology in their curriculum as separate courses. Also, the data was used to determine if there is a correlation of pass rates of PA programs with more diverse students in specific geographical regions that serve aging populations. This information helps fill the gap in the literature by ascertaining the significance of the use of more diverse PA's in the health care industry and their ability to impact care for the health and wellness of the aging population.

50. Characteristics of Medicaid Dental Providers Who Provide Oral Health Services

to Pregnant Women in Virginia

Hasib Zaman, Depts. of Bioinformatics and Computer Science, with Dr. Shilipa Naavaal, VCU School of Dentistry

Introduction: Medicaid is a federal program that provides health insurance for low-income adults, children, pregnant women, and elderly adults in the United States. Virginia expanded their Medicaid, both financially and demographically, in January 2019 and currently has 1,317,981 individuals enrolled in Medicaid, which is an increase of 39.7% from 2018; however, within this expansion, there was no increase in budget for dental Medicaid. Although there are programs, such as Smile for Children, that cater to the oral health of pregnant women, many women do not use the available opportunities due to limited awareness and accessibility of services, as well as cultural factors affecting the quality of service (e.g., linguistic differences). Furthermore, only 39% of dentists nationwide accept Medicaid and/or children's health insurance, which not only discourages young families from seeking oral healthcare, but also limits their accessibility to these vital services. In order to clarify oral healthcare disparities for pregnant women, this study will explore the characteristics of providers who participate in Medicaid and provide oral health services to pregnant women in Virginia. Findings can inform policy focused on improving Medicaid participation among dental providers. **Methods:** The 2015-2018 Medicaid provider data was obtained through the State Department of Medical Assistance Services. The license numbers of each provider were collected using a public License Lookup tool available through the Virginia Department of Health Professions (VDHP). Additional provider characteristics (i.e., gender, age, years in practice, location) will be requested from the VDHP. Descriptive analysis is done to explore the characteristics of Medicaid providers, to map the distribution in the state of Virginia. **Results:** Analyses revealed that most providers were located in the Eastern and Northern regions of Virginia's health districts (55%). These regions have the greatest number of providers that were involved in Medicaid, as it is a very suburban area containing a vast variety of demographics. Following these regions, there are approximately 11% of the providers in the Central region. Furthermore, the Northwest and Southwest regions combined to make up for approximately 34% of providers. Further analysis will be conducted in order to determine the socio demographic context of the providers within these regions. **Discussions:** During pregnancy, there is an increase in hormones that can affect one's body's response to plaque which can lead to increased tooth decay or gum disease. Therefore, there is a need to improve dental providers' participation in Medicaid to improve oral health services among pregnant women. These results have implications for workforce growth and development. Our study results suggest disparities in the distribution of dental providers by various characteristics. Findings provide an overview of the distribution of Medicaid, oral health providers throughout Virginia, with a particular concentration in the Northern region. Additionally, with regions such as Eastern and Northwestern that have a higher percentile of women that do not speak English fluently while having more providers that tend to be caucasian, there are demographic barriers between the two parties that inhibit women from seeking services.

51. WHAM: Wellness, Happiness, and Mindfulness: A Pilot Class at Open High School for the Translational Application of Well-being Education

Emaan Dawood, Depts. of Biology, Chemistry, & Spanish, and Moorin Khan, with Dr. Christy Tyndall, VCU Honors College

The education of student well-being is desired as evidence-based positive psychology

principles explain how humans can better succeed in life despite surmounting obstacles. Based on a VCU honors class titled “Flourishing,” which educates incoming freshmen about the science of health and wellness, a similar pilot class titled “WHAM: Wellness, Happiness, and Mindfulness,” implemented at Open High School, targets younger students. The goals for WHAM are to encourage high school students to build resilience through obstacles, develop strategies to promote well-being, and increase overall life satisfaction. An additional goal of the course is to learn more about which well-being principles are most helpful for high school students and why. The curriculum of WHAM was created with a focus on positive psychology principles and strategies that enhance well-being. Each class begins with discussion of a specific principle followed by an applied in-class activity of that principle. Covered principles included mindfulness, gratitude, stress and time management, physical health, meaning and engagement, relationships, and accomplishments. From student feedback and discussions, our pilot class has informally revealed that practicing well-being activities amongst high school-aged students promotes their relaxation and appreciation, indicating that the course effectively increases awareness of well-being practices. Therefore, our goal for the next session of WHAM will be to provide objective and formalized measurements of student well-being pre and post completion of the class. Measurements will be determined from surveys of evidence-based literature assessing different areas of well-being. The results will reveal how much students benefit from well-being education, help improve teaching methods, and provide insight for such a course being a standard in student education.

52. How the Diversity of Curriculum Prepares Future Physician Assistants (PA's) to Provide Healthcare for Underserved Populations

Jessica Lim-Wilson, Depts. of Health, Physical Education & Exercise Science and Psychology, with Dr. Christine Booker, Dept. of Kinesiology and Health Sciences

This research project was conducted to explore the availability of the diverse curriculum in Physician Assistant programs by region as well as the scope of PA responsibility across the United States. Using the information collected, the association between Physician Assistant curriculum and underserved population health outcomes by region was examined. In conclusion, this research has assisted in understanding the relationship between PA education and health outcomes.

53. The Moderating Role of Body Appreciation on Ethnic Identity and Condom Use Intentions

Breanna Jones, Depts. of Psychology and Sociology, Noelle Manfredi, and Calvin Hall, Dept. of Psychology Graduate Student, with Dr. Kristina Hood, Dept. of Psychology

Scholars have long explored the influence of ethnic identity affirmation, or feelings of belonging to one's ethnic group (Phinney, 1990), on sexual health outcomes (e.g., condom use intentions; Beadnell et al., 2003). Higher ethnic identity safeguards against risky sexual behaviors (Townsend et al., 2010), such that those with higher ethnic identity affirmation reported less risky sexual behaviors. However, limited research has explored how personal factors, such as positive body image (i.e., body appreciation), may influence the relationship between ethnic identity and sexual risk behaviors. Previous research found that women with higher body appreciation tend to report greater condom use self-efficacy (Grower & Ward, 2018). Furthermore, findings suggest that body appreciation and ethnic identity affirmation are positively associated (Cotter et al., 2013), such that those with higher body appreciation reported greater ethnic identity affirmation. However, body

appreciation, ethnic identity affirmation, and condom use intentions have not been studied together. Responsively, the current study aimed to examine the role of body appreciation on the relationship between ethnic identity affirmation and future condom use intentions in a sample of Black and Latinx women. This study was guided by the theory of plan behavior (Ajzen, 1985; Townsend et al., 2006)), which asserts that one's behavioral intentions (e.g., condom use intentions) are tied to social norms and their attitudes about themselves and others. We hypothesized that body appreciation would moderate the link between ethnic identity affirmation and future condom use intentions. The current sample consisted of 148 heterosexual Black (n= 81) and Latinx women (n= 67), ages 18 to 60 (M= 30.78, SD= 7.65), who were recruited from Amazon Mechanical Turk.

The Hayes PROCESS (2017) regression-based tool was used to examine whether body appreciation moderated the relationship between ethnic identity affirmation and future condom use intentions after controlling for age and relationship status. Results suggest an interaction between ethnic identity affirmation and body appreciation on future condom use intentions, $B(SE) = -.11(0.06)$, $\Delta R^2 = .02$, $p = 0.05$. To interpret the statistically significant moderation effect, Hayes's (2017) PROCESS v.3 Johnson-Neyman analysis was used. For Black and Latinx women with lower body appreciation, ethnic identity affirmation did not influence condom use scores, $b(SE) = -7.20 (.05)$, 95% CI[-.17, 0.28], $p = 0.16$. However, for Black and Latinx women with higher body appreciation, those with lower ethnic identity affirmation had greater condom use intentions than those with higher ethnic identity affirmation, $b(SE) = 0.84(.90)$ 95% CI[-.40, -0.52], $p = 0.01$. That is, among participants who appreciate their bodies, those who felt less belonging to their ethnic group endorsed greater intentions to use condoms in the future compared to those who felt greater belonging to their ethnic group. Findings suggest that, the influence of body appreciation differs based on one's level of ethnic identity affirmation, which is counterintuitive to literature suggesting that low ethnic identity is associated with worse sexual health outcomes (e.g., Espinosa-Hernandez & Lefkowitz, 2009). For that reason, more research is needed to replicate the current findings.

54. A Game-Theoretic Model of Monkeypox to Assess Vaccination Strategies

Sri Vibhaav Bankaru, Depts. of Biomedical Engineering, Math, & Chemistry, Samuel Kossol, William Hou, & Parsa Mahmoudi, with Dr. Jan Rychtar, Dept. of Mathematics

Monkeypox (MPX) is a zoonotic disease similar to smallpox. Its fatality rate is about 11% and it is endemic to the Central and West African countries. In this paper, we analyze a compartmental model of MPX dynamics. Our goal is to see whether MPX can be controlled and eradicated by voluntary vaccinations. We show that there are three equilibria - disease free, fully endemic and previously neglected semi-endemic (with disease existing only among humans). The existence of semi-endemic equilibrium has severe implications should the MPX virus mutate to increased viral fitness in humans. We find that MPX is controllable and can be eradicated in a semi-endemic equilibrium by vaccination. However, in a fully endemic equilibrium, MPX cannot be eradicated by vaccination alone.

55. The Effect of Amitriptyline on Biomarkers Associated with Brain Health and Drug Metabolism

Ashana Jackson, Dept. of Psychology, Bukola Odeniyi, and Omar Hassan, with Dr. Elvin T. Price, VCU School of Pharmacy

High anticholinergic drugs, like amitriptyline have been linked to dementia and other

neurodegenerative diseases. Chronic use of high doses of amitriptyline can lead to a decrease in brain capabilities and even negative effects on short-term memory. Expression of different brain biomarkers are also linked to various cognitive decline: Decreased expressions of PPARG and CREB1 have been correlated with a decrease in the brain's ability to protect against aging, and impaired spatial memory, respectively. Increased expression of CACNA1C has been negatively correlated with short term object recognition. Therefore, the study examined the effect of amitriptyline on brain biomarkers: CACNA1C, CREB1, and PPARG. Human astrocytes were grown and separated into three 6-well sample plates. Cell treatment groups were: ILB, Amitriptyline 50M, Amitriptyline 220M, ILB + Amitriptyline 50M and ILB + Amitriptyline 220M. The mRNA expression was measured using RT-PCR. The data was analyzed by graph pad prism and ANOVA with Sidak's multiple comparison's test. After exposure of astrocytes to both concentrations of amitriptyline, there was increased expression of the CACNA1C and decreased PPARG. Exposure to 220M amitriptyline lead to decreased expression of CREB1, but amitriptyline at 50M lead to an increase in expression. Findings indicated that amitriptyline significantly increased expression and decreased expression of PPARG. Though, different concentrations had varying effects on CREB1. These results indicate that the cognitive decline linked to amitriptyline are likely the effects that this drug has on these genes.

56. Stress and Positive Coping in Older Adults

Jazzmin-Guy Swain, Dept. of Exercise Science, with Dr. Faika Zanjani, Dept. of Gerontology

Stress can become a huge health risk factor for older adults. Stress occurs when individuals experience demands or threats without sufficient resources to meet these demands or mitigate threats. Everyone has some form of the same stressor(s), money job/school, health and family, which are the main common stressors. In every population, if those stressors are prolonged the stress can become chronic and become detrimental to a person's health. The reason stress often becomes chronic is because individuals may not know how to overcome their stress. As individuals age their health can decline but the stress doesn't necessarily dissipate which then put older adults at increased risk of diseases. One stressor that the older adults uniquely experience is stress about their age. Older adults can experience stress related to worries about growing old, like potential declines in mobility, brain functioning, health, hearing and seeing, and ageism, discrimination against a person because of their old age. A way to address the effect that stress has on the older population is by giving advice on positive coping mechanisms. Introducing positive ways to manage stress can potentially have positive effects for reducing the stress, and also providing a positive viewpoint on aging and improving health. Accordingly, this study aims to obtain feedback on a developed positive coping poster. In collaboration with iCubed Health and Wellness Aging Core and Richmond Health and Wellness Program (RHWP), we implemented a survey to assess poster feedback and aging related stress levels to RHWP low-income senior housing resident population. Survey results will provide insight about the individual stress and how they feel about using positive coping mechanisms to cope with their own stress. The poster design, development, justification, and preliminary survey data from n=10 participants will be described and discussed to direct future health interventions.

57. A proposal for a social dance intervention to improve health in older African Americans living in community settings

Olivia Alsamadi, Dept. of Dance & Choreography, with Dr. Ana Diallo, VCU School of Nursing

Introduction: Older low-income African Americans are at high risk for health problems such as falls, hypertension, stress, and depression, partly due to limited physical activity. Despite the fact that most healthcare professionals prescribe exercise, older adults are likely to drop out of exercise programs or avoid them altogether due to multiple barriers, including lack of interest. Social dance interventions offer innovative solutions for introducing exercise to interested individuals seeking an alternative exercise program. Low-impact aerobic exercise from social dance, for instance, can help address some health problems afflicting older adults, such as mobility, balance, sleep, and gait patterns. Additionally, the endorphins released from the exercise in conjunction with social interaction can combat residents' depression and social isolation experiences. Furthermore, offering the opportunity to engage in social dancing as exercise on-site eliminates transportation barriers that keep older adults from participation. As part of the VCU Institute for Inclusion, Inquiry and Innovation (iCubed) Health and Wellness Aging Core and in collaboration with the Richmond Health and Wellness Program (RHWP), our research team plans to work with senior residents of a low-income public housing building to assess the feasibility of introducing a social dance intervention to improve physical and mental health. Following implementation of the social dance intervention, it is hypothesized that there will be improvement in participant health and attitudes toward dance as physical activity. **Methods:** Ten residents will be recruited on a volunteer basis and then assessed by the occupational therapist on-site to determine whether this form of exercise is safe for this population. The research team will conduct surveys to assess residents' past and current experiences and attitudes toward dancing, and their physical/mental health status. The research team will develop a social dance intervention based on residents' feedback and tailored to their interests (e.g., line dancing). The proposed intervention will take place two times a week, each session lasting forty-five minutes, over a three-week period. Focus groups with the residents pre- and post-intervention will inform the development of this social dance intervention, as well as provide insight on their overall experience with said intervention. Data collected from the focus groups will be analyzed to determine how the participants' attitudes about their health and physical activity change over the three weeks. **Discussion:** The research team hopes to find that the health of the subjects will improve after the intervention as well as their attitudes about their health. This can be tracked through the surveys that are taken before and after the intervention, and the responses given in the focus groups. The research team also hopes to see a new sense of community with the residents in this new group activity that can continue outside of the intervention. A possible limitation could be residents dropping out during the intervention, but we hope to prevent this by having the program onsite for the residents so it is easily accessible. Using social dance, we hope to create and foster a long-term relationship with the residents and sustained exercise and social interaction.

58. Strengthening Student Engagement in Alternative School Settings

Alisha Robinson, Depts. of Social Work and Sociology, with Dr. Erin Burke Brown, VCU ASPIRE

In the United States public school system students who attend alternative high schools (AHS) are identified as the most socially and academically marginalized group of individuals. AHS last chance and remedial programs are used as a behavioral remediation intervention to serve students who have been expelled or suspended from their traditional school. Reasons that contribute to students attending AHS include poor grades, negative behavior, truancy, and involvement with the juvenile justice system. The student population within AHS settings are highly comprised of at-risk African American and Latinx

students from low-socioeconomic environments. As AHS are intended to promote a positive learning environment with beneficial resources, the outcomes of past enrolled students are alarming. Dropout rates have continually risen within the AHS student population. As well, students are being sent to juvenile detention centers at an increased rate. Students' experiences in the alternative learning environment affect their perception of school, how they engage within the environment, and their overall educational outcome. Therefore, this project sought to find effective interventions that would promote behavior, academics and attendance for students in alternative school settings. Through a summer volunteer experience, various themes were formulated that can positively enhance student engagement within AHS settings.

59. Fenofibrate-Loaded Biodegradable Nanoparticles for the Treatment of Neovascular Age-Related Macular Degeneration

Russell Simmers, Depts. of Physics and Chemistry, with Dr. Qingguo Xu, VCU School of Pharmacy

Background: Neovascular age-related macular degeneration (AMD) is a leading cause of visual impairment in the elderly population in the industrialized world. The current treatment for neovascular AMD is anti-vascular endothelial growth factor (anti-VEGF) therapy; however, nearly 40-50% of patients do not fully respond to anti-VEGF therapy. Therefore, non-VEGF therapeutics are required for neovascular AMD treatment. Fenofibrate is a peroxisome proliferator-activated receptor alpha (PPAR α) agonist and has demonstrated robust therapeutic effects on neovascular AMD in animal models; however, it must be delivered frequently via intravitreal injection due to quick clearance of the drug from the eye, and may induce injection associated side effects such as retinal detachment, ocular hemorrhage and endophthalmitis. **Purpose:** To develop and optimize fenofibrate-loaded poly(lactic-co-glycolic acid) (PLGA) nanoparticles (Feno-NP) with high-drug loading and long-lasting drug release profile to effectively treat neovascular AMD for 6-months with one single intravitreal injection. **Methods:** Feno-NPs were prepared by emulsification method and were fully characterized in terms of particle size, surface charge, morphology and in vitro drug release profiles and the ocular pharmacokinetics studies were performed in rats following intravitreal injection. Efficacy on neovascular-AMD was determined by measuring vascular leakage, vascular permeability, and the numbers of subretinal neovascular (SRNV) and intraretinal neovascular (IRNV) lesions after intravitreal injection of Feno-NPs in a laser-induced choroid neovascularization (CNV) rat model.

60. Establishing a Community-Academic Partnership to Investigate the Sociopolitical Context of Oral Care Among Refugees Resettled in Richmond, Virginia

Tatiana Brown, Depts. of Anthropology, Medical Humanities, & Mathematics, with Dr. Dina Garcia, Dept. of Health Behavior and Policy

This study has established a community-academic partnership between four organizations and VCU Health Behavior and Policy's Kalpulli Research Team to investigate the sociopolitical context of oral health needs among refugees resettling in Richmond, Virginia. In the year 2018, 1,689 refugees resettled in the state of Virginia; 47.7 percent of this population reported oral health needs during their initial health assessment screening. Despite the oral health needs present within this population, little is known about the facilitators and barriers to dental care access for this population post-resettlement. Creating a partnership with two local resettlement agencies (e.g., the International Rescue Committee, Commonwealth Catholic Charities), the Department of Social Services (DSS),

and VA Department of Health's Newcomer (Refugee) Health Program, in addition to having a transdisciplinary research team, enable the development of a holistic representation within, and of, the refugee community. The use of semi-structured interviews is the strongest approach to build the research team's understanding of community perceptions towards access to oral health care, refugee health workers' identified barriers to equitable care, and providers' attitudes towards treating the refugee and Medicaid population. Community partners are key in shaping study recruitment, determining which interview questions will be most salient, and creating an effective intervention from the results. This partnership plans to create two collaborative interventions: a process map to help refugees better navigate establishing care with local providers and "oral care cards" in the top three refugee languages (Arabic, Farsi/Dhari, and Swahili) to be distributed through dental providers in the area.

61. Stakeholder Perceptions of Health Needs in Refugee Populations in the Greater Richmond Area

Ashley Koo, Depts. of Medical Anthropology and Chemistry, Matt Tessama, and Tatiana Brown, with Dr. Dina Garcia, Dept. of Health Behavior and Policy

A refugee is a person outside of the country of his or her nationality who is unable or unwilling to return to that country because of persecution or a well-founded fear of persecution based on her race, religion, nationality, or membership in a certain social group. The United Nations High Commissioner on Refugees estimates that in 2018, approximately 22,500 refugees were resettled in the U.S. with 1,805 arrived in Virginia. Many of these refugees face multiple health challenges post-resettlement, particularly in oral health. Although these oral health needs are a recognized concern, there is very little information to support what the specific facilitators and barriers to dental care access is for this population. The long-term objective of this study is to identify the largest gaps in healthcare access for refugee populations, and plan an intervention to bridge these gaps through local clinics. The health and oral health needs of refugees post-resettlement can be determined through one-on-one semi-structured interviews with health liaisons. The participants will be recruited from a list of organizations involved in refugee resettlement and employment, including the Virginia Department of Health, Commonwealth Catholic Charities, ReEstablish Richmond and the International Rescue Committee. The interviews will allow stakeholders to share their experience serving the refugee community, their perspective on health needs that are present in this population and ideas on how to address these needs. The interviews will be audiotaped and then transcribed via research participants and stored in the password-protected MAXQDA software. There exists a link between dental/ oral health and overall health: untreated dental cavities can lead to cardiovascular issues and can be fatal. Intervention within the community is needed to increase healthcare access; analyzing stakeholder perspectives will allow greater understanding of what inequities exist for refugee populations in the Greater Richmond area.

62. Behavioral Health Integration in Primary Care

Casey Zapata, Depts. of Psychology and English, Demetrius Carter, & MaryKate Crawford, and Samantha Mladen, Emily Donovan, Amber Fox, & Kristen O'Loughlin, Dept. of Psychology Graduate Students, with Dr. Bruce Rybarczyk, Dept. of Psychology

Background/Aims: Due to limited access to mental health care, many patients present to primary care with mental health concerns, such as depression and anxiety. Integrated

primary care (IPC), an emerging practice model that integrates behavioral health providers with medical providers in primary care, has been demonstrated to improve patient outcomes. This project aims to characterize patients being seen in safety-net IPC, both demographically and clinically. **Methods:** The data were collected across three safety-net clinics in the Richmond area. The sample consisted of 96 adult patients: 68 female (71%), 24 male (25%), 1 non binary (1%), and 3 not collected (3%); 54 African-American (56%), 29 White (30%), 1 Asian (1%), 1 Other (1%), and 11 not collected (12%). Measures included a patient-completed checklist of patients' behavioral health concerns, the PHQ-9 for depression, the GAD-7 for anxiety, and clinician-completed chart review for demographic factors. **Results:** Of the 72 patients who completed the GAD-7, patients reported 13 (18%) severe symptoms of anxiety, 11 (15%) moderate symptoms, 15 (21%) mild symptoms, and 33 (46%) subclinical symptoms. For the 37 patients who completed the PHQ-9, patients reported 7 (19%) severe depressive symptoms, 10 (27%) moderately severe symptoms, 12 (32%) moderate symptoms, 6 (16%) mild symptoms, and 2 (5%) subclinical symptoms. The six most commonly patient-reported problems were stress (n= 73), anxiety (n= 70), depression (n= 65), sleep (n = 55), grief (n = 53), and irritability (n= 53). When asked to rank their top three concerning problems, the five concerns most commonly ranked as top problems were: (1) anxiety (n = 29), (2) stress (n = 28), (3) depression (n = 27), (4) sleep (n=16), and (5) weight (n=15). Further, 56 (58%) participants reported both depression and anxiety as among their top three concerns. **Discussion:** Anxiety and depression were reported by the majority of patients, with 33% experiencing at least moderate anxiety and 78% experiencing at least moderate depression. Additionally, anxiety and depression were cited as the third most commonly reported concerns, respectively, as well as ranked within the top three most concerning problems for most participants. Stress, anxiety, depression, and sleep were included in both the most commonly reported problems and the most common top three concerns of participants, suggesting that these concerns are both pervasive and troublesome for participants. Over time, this project will prioritize increasing sample size and tracking longitudinal trends. The continued study of safety-net IPC may allow for increasing access to behavioral health, identifying common behavioral health concerns in primary care, and meeting unmet patient needs.

63. The Role of Pyrethroids on Cell Cycle Regulation and Craniofacial Development in *Xenopus laevis*

Kylee Hockaday, Depts. of Biology and Chemistry, with Dr. Amanda Dickinson, Dept. of Biology

Pyrethroids are synthetic insecticides that are found in many household items such as pet flea medication. Pyrethroids are used more so than organophosphate pesticides due to increasing concerns about non-target effects. However, there is some concern with pyrethroid exposure resulting in teratogenic effects including craniofacial defects. Using a *Xenopus* model, three pesticides (AMDRO Quick Kill, Pyrethrum, and Cypermethrin) were tested for their effect on craniofacial development. Following AMDRO treatment, embryos developed edemas, abnormal gut development, and shorter distances between eyes. Cypermethrin exposure caused a decrease in face width of embryos.

Immunohistochemistry colorimetric staining in AMDRO treated embryos resulted in a significant decrease (p-value = 3.644×10^{-6}) in mitotic cells of the face. Preliminary data from acridine orange treatment of embryos exposed to pesticide suggests a link to cell death programs. Delta-delta Ct analysis of p53 expression in embryos treated with AMDRO yielded values of 0.371130893, 0.143587294, and 12.46663327. Expression fold analysis of p53 expression in pyrethrum treated embryos yielded values of 1.310393, 1.347234,

8.282119, and 1.681793. Expression fold analysis of p53 expression in Cypermethrin treated embryos yielded a value of 1.26575659. All treatments yielded an average increase in p53 expression compared to expression levels in control embryos. This indicates that the mechanism through which pyrethroid insecticides work may involve apoptosis and the transcription of the p53 gene.

64. Trafficking Patterns of KCNQ1 and KCNE1 and Assembly into the Slow Delayed Rectifier (I_{ks}) Channel

Sukhleen Kaur, Depts. of Bioinformatics and Chemistry, with Dr. Gea-Ny Tseng, Dept. of Physiology and Biophysics

KCNQ1 and KCNE1 are both proteins that are essential in maintaining cardiac electrical stability. The assembly of the two units forms the slow delayed rectifier channel (I_{ks}) which plays a role in repolarization of the action potential in adult ventricular myocytes when a shorter action potential is required. I_{ks} remains unassembled under basal conditions as KCNQ1 and KCNE1 are segregated. While KCNQ1 is a pore-forming subunit, KCNE1 is a smaller, auxiliary subunit. The assembly of both subunits is essential in forming I_{ks}, for they do not function when they are present as separate, individual units. In other words, the two units are mutually inclusive, yet they both have very different properties, especially in reference to the trafficking phenomenon of each protein following translation. The question being addressed, therefore, was “how do KCNQ1 and KCNE1 assemble to form I_{ks} channels in COS-7 cells and adult ventricular myocytes?” Confocal imaging experiments were conducted to visualize the movement of fluorescent protein-tagged KCNQ1 and KCNE1 in COS-7 cells at fixed time points. The RUSH (retention using selective hooks) construct was utilized to analyze the proteins after they had exited the endoplasmic reticulum (ER). Biotinylation experiments were furthermore conducted in order to quantify cell surface KCNQ1 and KCNE1. Lastly, more imaging experiments were conducted, this time using adenovirus-mediated expression in cardiomyocytes, to address the research question. The results of the experiments showed KCNQ1-GFP traveled largely in the ER network and budded out into vesicles which then fused with the cell membrane. On the other hand, KCNE1-dsRed traveled largely in vesicles throughout the cytoplasm. Through the limited results of the experiments, it was concluded that KCNQ1 and KCNE1 traffic separately and in different manners to the plasma membrane and assemble into the slow-delayed rectifier channel on the cell surface.

65. Parent-Child Perception of Cancer-Specific Quality of Life and Relationship to Medication Adherence

Tiara Bolden, Dept. of Psychology, and Evrosina I. Isaac, VCU School of Medicine Medical Student, with Dr. Jennifer M. Rohan, Children’s Hospital of Richmond at VCU

Background: Medication adherence has a significant impact on health outcomes in pediatric cancer with adherence <95% indicating a significant increase in relapse risk. In recent years, the literature on medication adherence in pediatric oncology has increased. However, there is a lack of research on determining what specific factors may result in nonadherence. The current research was conducted to address the gaps in the literature regarding parent-child perceptions of cancer-specific quality of life and medical adherence.

Objective: The objective of this study was to assess the relationship between quality of life and medication adherence in the pediatric oncology setting. We also aim to examine the discrepancies of parent and child perceptions in cancer-specific quality of life. To our knowledge, there is limited literature on parent-child rater discrepancies in pediatric cancer

studies. **Methods:** Children/adolescents ages 7 to 19 years old (N=139; Mage = 12.29 ± 3.44) diagnosed with cancer who were in the maintenance phase of treatment were monitored over fifteen months by using Medication Event Monitoring System devices to examine medication adherence. Parents and patients completed an assessment battery, which included a Parent- and Child-Report of PedsQL Quality of Life Inventory.. Assessments were taken at baseline, six months, and 15 months. **Results:** A bivariate (Pearson) correlation suggested that there was a significant relationship between parent and child reports of cancer-specific quality of life across all domains from baseline to 15 months ($p < .05$) We also identified three group-based trajectories of quality of life, including an optimal, moderate, and low quality of life group across 15 months. **Conclusion:** These preliminary findings suggested the importance of examining both patient and parent-reported cancer specific quality of life as parents and patients may not always report congruent perceptions of quality of life during cancer treatment. Future interventions should explore strategies for improving quality of life and medication adherence in pediatric cancer.

66. Exploration of the Neuronal Subtype Specificity of an Ethanol Responsive Gene: Glycogen Synthase Kinase 3 Beta (Gsk3b)

Dalton Huey, Depts. of Bioinformatics, Biology & Chemistry, A. van der Vaart, G. M. Harris, and M. F. Miles, with Dr. Sarah Golding, Dept. of Biology

Previous work done in our laboratory revealed that Glycogen Synthase Kinase 3 Beta (Gsk3b) functions as a hub gene in a network of genes regulated by acute ethanol in the medial prefrontal cortex (mPFC) across a mouse genetic panel. Adult mice treated with acute ethanol showed increased phosphorylation of GSK3B on the Ser9 residue in prefrontal cortex. Subsequent viral-mediated overexpression of Gsk3bin mouse mPFC caused an increase in ethanol consumption and pharmacological inhibition of GSK3B decreased ethanol consumption. However, it is unknown what neuron subtypes are driving this change in behavior. Here, we provide evidence that deletion of Gsk3bin Camk2a+ glutamatergic neurons of the mPFC results in a decrease in ethanol consumption in both continuous and intermittent access drinking paradigms. Furthermore, we have recently designed and validated a plasmid for Cre-dependent overexpression of Gsk3b, along with a Cre-dependent reporter as a control. These plasmids are planned for use in conjunction with different Cre drivers for viral-mediated expression in any cell type. Dissection of the neural circuitry of this ethanol responsive pathway can lead to a better assessment of Gsk3bas a potential target for the treatment of alcohol use disorders. Work supported by grants R01A027581 and P50AA022537 to MFM.

67. Psychometric Assessment of the Spanish SCORE-15 for Families of Individuals with Parkinson's Disease in Mexico

Jack Watson, Dept. of Psychology, Dr. Grace McKee, Mid-Atlantic MIRECC, Dr. Sarah Lageman, VCU School of Medicine and Dept. of Psychology, Dr. Teresita Villaseñor, University of Guadalajara, and Dr. Paul Perrin, Dept. of Psychology

Background: Parkinson's disease (PD) is the second most common neurodegenerative disorder and can lead to a number of mental health problems for both patients and caregivers. Research has suggested that worse caregiver mental health predicts greater patient mortality for individuals with neurodegenerative diseases, and caregiver mental health is best when family needs are met. As healthcare trends toward an outpatient, home setting, it is important to study the effects of PD within the family setting. **Objective:** To

test the proposed three-factor structure found in English of the Spanish Systemic Clinical Outcome and Routine Evaluation (SCORE-15, a measure of family dynamics) in a sample of PD caregivers from Mexico. **Method:** PD caregivers (n = 148) were recruited from an urban academic medical center in Mexico. Confirmatory and exploratory factor analysis (CFA/EFA) of the SCORE-15 were conducted. **Results:** Results from an initial CFA suggested that the three-factor SCORE-15 solution was a poor fit to the data, and an EFA was conducted in order to determine a better factor structure. We found evidence for a two-factor structure representing (1) general pathology and (2) family strengths. This factor structure bore little resemblance to the original three-factor structure (strengths and adaptability, overwhelmed with difficulties, and disrupted communication). **Discussion:** The SCORE-15 was originally validated in an English-speaking population. Our results suggest that the SCORE-15 does not measure the same three factor structure in Spanish in the context of PD for which it was intended within English-speaking samples. This could be due to the wording of the measures, the translation, or the cross-cultural applicability of family dynamic constructs. Future research would benefit from investigating this discrepancy in order to improve cross-cultural sensitivity in measures of family dynamics.

68. Targeted Bisulfite Pyrosequencing & Amplicon Bisulfite Sequencing Epigenetic Analysis

Charles Tran, Dept. of Biology, with Dr. Karolina Aberg, VCU School of Pharmacy

Background: The Great Smoky Mountain Study is a longitudinal study that started in 1992 and includes 1,420 participants that were 9 to 13 years at intake and have since been revisited ~ every 2 years. Participants (and their parents) provided detailed assessment of stressors and health outcomes as well as blood samples at each interview. In a recent methylome-wide association study the samples were used to identify methylation marks associated with childhood trauma. In the current work, we present an investigation to replicate these methylation marks in an independent sample. **Objective:** Our objective is to optimize and apply epigenomic-specific protocols in order to replicate trauma associated methylation biomarkers in an independent study sample. **Materials and Methods:** We will use DNA samples extracted from saliva from The Young Adolescent Project, another longitudinal study which has obtained relevant information related to childhood trauma. In this sample we will perform replication of top findings using targeted amplicon bisulfite sequencing in saliva samples where amplicons are amplified with JUNO sequencing platform or Pyromark PCR pyrosequencing. Forward and reverse primers are first designed using Pyromark Assay Design software. Primer set candidates are chosen based off of a score of 100; scores are determined by potential for mispriming, likelihood for primer dimers, etc. Higher scores correlate to better PCR performance. Then, BiSearch, an online primer-design algorithm and search tool is used to check primer sets in order to ameliorate PCR efficiency by avoiding non-specific PCR products due to genomic repetition. PCR product is then examined with 2% agarose gel electrophoresis and Agilent Bioanalyzer chip-based capillary electrophoresis in order to determine if amplicons of the correct size were obtained. (Once primers of sufficient efficacy are designed, they are subject to 5' biotin tag modifications—this makes purification of proteins and other target molecules easier while utilizing streptavidin-coupled Dynabeads). Methylation sites incompatible with JUNO due to amplicon sites exceeding 200 base pairs would instead be analyzed using Pyromark Pyrosequencing Assay for which it is easier to design assays but is more costly and lower throughput: the output of resulting data being similar in quality. **Results:** We attempted to design assays for 60 loci. Of these we have designed and validated the quality of 23 assays for JUNO and 3 for the Pyromark Q96 sequencing and quantification platform. PCR

analysis followed afterwards. We were not able to design assays for 34 sites due to: amplicon sites having exceeded 200 base pairs, forming of hair pins, forming of primer dimers, amplicon sites being too far from target region, or formation of multiple PCR products, as determined by IDT analysis. The 3 primer sets were incompatible with JUNO due to formation of primer dimer and hairpin formations when 5' tags were added therefore Pyromark Q96 assay was optimal. **Conclusion:** In conclusion we have optimized and evaluated 23 assays for the JUNO sequencing platform and 3 primers for Pyromark Q96 that, in the next step, will be used to assess the replication of loci of interest in trauma associated methylation biomarkers from saliva samples.

69. Medication Risk and Polypharmacy in Minority Older Adults

Rusha Patel, Depts. of Biology and Chemistry, with Dr. Youssef Roman, VCU School of Pharmacy, Dr. Elvin Price, VCU School of Pharmacy, and Dr. Lana Sargent, VCU School of Nursing

Introduction: Adverse drug events refer to an individual being harmed due to taking a medication. These risks can include side effects, damage to different organs, senses impairment and more. The older adult population has the highest risk for adverse drug events. Antibiotics and anticoagulants are some examples of medication that cause higher adverse events in the elderly. The Beer's List also includes drugs and their possible side effects. Anticholinergic can cause confusion and dry mouth, anti-infective can cause pulmonary toxicity, and cardiovascular medication can cause damage to the nervous system and increase toxicity in other organs. These events are preventable with caution, but it is important to recognize which medications are taken and the possible interactions/risks for the elderly. The purpose of this study was to evaluate the number of high-risk medications used by older adults (age 60 and older) living in a low-income community-based housing. Participants included had no history of dementia, Alzheimer's, or Lewy-body disease. **Methods:** Data will be collected at senior apartment buildings in the Richmond area and at the VCU Health Clinic through the Richmond Health and Wellness Program (RHWP) among Older Adults. Demographics analysis includes age, sex, race/ethnicity, and housing location. Variables considered in the model include; 1) Social Determinants of Health (SDH) as defined by income, race/ethnicity, and education; 2) Medication risk will be measured by polypharmacy ≥ 5 medications, Anticholinergic burden (ACB) score, drug class, and number of medications on the Beer's list. Polypharmacy numbers ≥ 5 and ≥ 7 were compared to see how much the difference would be significant. **Results:** Findings and study hypothesis focus on identifying number of individuals taking high risk medications. When the polypharmacy medication was compared using the chi square statistics, the results were significant with a p-value of 0.02. **Conclusions:** Study implications have an impact on older adult drug safety. With results being significant, it can be concluded that the number used to compare polypharmacy mattered for these results.

70. Vicarious Trauma Exposure and Its Effects on Mental Health among Adolescents and Adults: A Narrative Research Review

Harrison Davis, Dept. of Psychology, Angel Whitfield, Sydney Judge, Bailee Beverly, Jenna Minter, and Eryn DeLaney and Chloe Walker, Dept. of Psychology Graduate Students, with Dr. Chelsea Williams, Dept. of Psychology

A narrative research review was conducted to examine studies that have tested the relation between vicarious trauma (i.e., witnessing abuse of others; Trautmann, S., Reineboth, M.,

Trikojat, K., Richter, J., Hagenaars, M. A., Kanske, P., & Schäfer, J. (2018). and mental health in adolescents and young adults. Using psycinfo to find research conducted to date, this review indicated that there are various types of trauma that adolescents might be exposed to (e.g., domestic abuse, emotional abuse, and physical abuse) and various forms of mental health issues (e.g., post traumatic stress disorder, depression, and anxiety) that might result from such trauma. (Erolin, K. S., Wieling, E., & Parra, R. E. A. (2014)., , Stowkowy, J., Goldstein, B. I., MacQueen, G., Wang, J., Kennedy, S. H., Bray, S., Lebel, C., & Addington, J. (2020). Findings from this review also suggest that there is a relation between varying types of traumatic exposure and several types of depressive symptoms (Monfort, E., Afzali M. H. (2015), Merza, K., Papp, G., & Szabó, I. K. (2015) and that there are more studies on adults than on adolescents. These effects will be discussed. Gaps in the literature will be referenced and potential future research directions will be acknowledged. In conclusion, this narrative research review emphasizes the importance of knowing the effects of vicarious trauma on adolescents and adults for preventative purposes.

71. Veteran Spinal Cord Injury: An Investigation of the Mediating Role of Pain Interference on the Relationship between Pain and Emotional Distress

Carly Blaine, Dept. of Psychology, Jack Watson, and Richard Henry, Dept. of Psychology Graduate Student, with Dr. Scott McDonald, VCU School of Medicine

Background: Pain commonly co-occurs with spinal cord injury (SCI) and has been linked to poorer psychological function. SCI patients who experience chronic pain report great levels of interference with daily life. Pain interference with daily life may lead to emotional distress and depression. **Objective:** Using the PROCESS macro (model 4; Hayes, 2017), this study examines whether pain interference with daily life mediates a positive relationship between pain severity and mental health. **Design:** This study used a cross-sectional design. **Setting and Participants:** 221 veterans with SCI were interviewed by a psychologist during their annual evaluation at a Veteran Affairs medical center outpatient clinic. **Outcome Measures:** Single-item, self-report, Likert scale measures of pain severity and pain interference (M-HIP) were used along with the Patient Health Questionnaire-4 (PHQ-4), a measure of mental health symptom severity. **Results:** Pain severity had a direct effect on mental health as well as an indirect effect through pain interference, using 5,000 bootstrap samples. The overall model was significant ($F[1, 219] = 17.763$, $R^2 = .075$, $p < .001$). The direct paths from pain severity to pain interference ($b = .857$, $p < .001$) and from pain interference to mental health ($b = .929$, $p < .001$) were both statistically significant. Further, the indirect effect of pain on mental health through pain interference was statistically significant ($b = .796$, 95% CI [.493, 1.140]), indicating a full mediation because the direct path from pain severity to mental health was no longer statistically significant in the model ($b = .094$, $p = .683$). **Discussion:** Findings suggest SCI-related emotional distress can result from the inability to participate in daily activities such as going to work, spending time with others, or engaging in hobbies due to pain. Such interference with regular life was found to significantly mediated the positive relationship between SCI-related pain and emotional distress. Future research may take a more qualitative account of how pain inhibits daily life emotionally and physically and focus on interventions designed to decrease pain's interference with daily living.

72. Advertising and Consumer Behaviors: Evaluating Microinfluencers on Social Media

Julianne Eubanks, Dept. of Psychology, with Dr. Jennifer Joy-Gaba, Dept. of Psychology

In advertising, social media networks such as Instagram have become opportunities for brands to advertise their products. Celebrities, with their millions of followers, often serve as brand ambassadors. As well, smaller accounts with more niche, engaged followings referred to in this study as “micro-influencers” also endorse products. The current study aims to determine if participants will (1) perceive micro-influencers as more trustworthy and authentic than name-brand celebrities and if participants will (2) be more likely to purchase a product when advertised by a micro-influencer. Participants viewed advertisements posted by celebrities and micro-influencers. Participants then rated each image for 1) how trustworthy and likable the influencer/celebrity appears, 2) how often the influencer/celebrity uses the product and 3) how likely the participants are to buy the product. We hypothesized that participants will rate the micro-influencers as more trustworthy and authentic than celebrities; as a result, we hypothesized that participants will be more likely to want to purchase the products advertised by micro-influencers.

73. Resilience in Relation to Post-Traumatic Stress Disorder and Coping Behaviors in Combat-exposed Veterans

Abigale Dagher, Dept. of Psychology, with Dr. Christina Sheerin, Dept. of Psychology and Virginia Institute for Psychiatric and Behavioral Genetics, and Dr. Ananda Amstadter, Dept. of Psychology and Virginia Institute for Psychiatric and Behavioral Genetics

Post-Traumatic Stress Disorder (PTSD) is a psychiatric disorder that can occur following a traumatic experience. Many veterans who are exposed to combat develop PTSD, yet many also show resilience following these stressors. Resilience can be defined as adaptive functioning in the face of stress or trauma. PTSD is often associated with less resilience while coping skills often increase resilience outcomes. However, it is less known whether the relationship is different across the different clusters of PTSD symptoms and different types of coping behaviors, which can be adaptive (e.g., social support) or maladaptive (e.g., drug use). Thus, this study aimed to investigate in a combat trauma-exposed veteran population 1) whether there was a difference in resilience scores as a function of PTSD status, 2) whether there was a different association with resilience by PTSD symptom cluster total severity score, and 3) which types of coping behaviors were more strongly related to resilience above and beyond PTSD symptoms. It was hypothesized that combat trauma-exposed veterans without PTSD would have greater resilience scores than those with PTSD, that the avoidance symptom cluster would be the strongest predictor of lower resilience in the veterans who have PTSD, and that coping subscales would be associated with higher resilience above and beyond PTSD status, but some coping subscales would be more strongly related to resilience than others. Following informed consent, participants (N=226, Mean age=30.48, 90.3% Male) were interviewed with a structured clinical interview (Clinician-Administered PTSD Scale for DSM-IV; CAPS-IV) and then completed a large battery of self-report assessment measures, including the Connor-Davidson Resilience Scale (CD-RISC) and the Coping Orientation to Problems Experienced (COPE). A t-test analysis was run to determine if there is a difference between trauma-exposed veterans with and without PTSD. Those with PTSD had a significantly lower resilience score (M=30.16, SD=6.96) compared to those without PTSD (M=32.68, SD=4.54), $t(174)=2.91$, $p=.004$. Next, a regression analysis was run with each symptom cluster total score predicting resilience total score. Avoidance symptoms significantly predicted lower resilience, $\beta=-.296$, $t=-2.397$, $p=.019$, but not re-experiencing $\beta=-.056$, $t=-.426$, $p=.672$ or arousal symptoms $\beta=.022$, $t=-.173$, $p=.863$. Finally, significant COPE subscales from correlation analyses were included as predictors of resilience, covarying

for total PTSD symptoms. Of the 14 coping skills examined, Positive reinterpretation and growth, Active coping, Turning to religion, and Acceptance were associated with greater resilience scores whereas Behavioral disengagement, and Focus on and venting of emotions were negatively associated with resilience scores (all $ps < .01$). In conclusion, all hypotheses were supported. Combat exposed veterans with PTSD had lower resilience scores than those without PTSD. Likewise, avoidance behaviors predicted higher resilience compared to the other symptom clusters, perhaps given the importance of avoidance for impacting daily functioning and maintaining symptoms. Finally, coping subscales were variably associated with resilience, suggesting that not all coping approaches are necessarily beneficial. Limitations of the study included self-report bias, little variability in resilience measure, and limited generalizability given the restricted sample demographics.

74. Moral Development of Eco-Martyrs

Ashley Sanico, Depts. of Psychology and Gender Studies, Women, & Sexuality, Ian McFadden, and Victoria Bee, with Dr. Richard Bargdill, Dept. of Psychology

Over the past 18 years, close to 2,000 individuals have been murdered in attempts to preserve the natural world. Those who have carried out the killings are corrupt individuals or institutions that wish to discard and destroy the environment for personal gain and wealth. For the past two years, we have been studying these venerable Eco-Martyrs and their efforts to preserve the ecosystems and communities around them. Today, we are commenting on how these late heroes exemplify Lawrence Kohlberg's final two stages of Moral Development, the Post-Conventional stages. The four individuals seen above, as well as their numerous counterparts are all consciously taking action to promote the stability and well-being of the environment around them while simultaneously bolstering the culture of the communities they belong to. These traits are indicative of individuals who have transcended the first two levels of moral development. It is a shame for us to have lost such forward-thinking individuals but it would be a greater dishonor to let these individuals die in vain and continue to reap rewards with no thought as to how it affects the world around us.

75. Trait Parochial Empathy Scale (TPES)

Lauren McLeod, Dept. of Psychology, and David Lansdell, with Dr. Jennifer Joy-Gaba, Dept. of Psychology

The goal of the research was to build and test a new scale regarding parochial empathy - a previously un-measured aspect of social interaction. Parochial empathy is the tendency to exhibit intergroup empathy bias (greater empathic concern for members of one's ingroup). Thus, the Parochial Empathy scale (TPES) measures how much an individual aids members of an outgroup compared to their willingness to aid their ingroup. Upon scale design, the TPES went through several validation measures. In the current study, participants were shown a pair of scripted videos given by college Democrat and Republican groups. Ostensibly, these groups were located on campus and were vying for donations from the participants. After viewing the message, participants were asked to determine how much money should be given to each group. Results revealed that the TPES suggests that participants donated more money toward their reported political identification (i.e., their ingroup) compared to the outgroup.

76. The Benefits of a Daily Personal Growth Practice

Carolyn Henao, Depts. of Psychology and Spanish, and Maria Ribera, with Dr. Richard Bargdill, Dept. of Psychology

The aim of this poster will be to describe autoethnographic research evaluating the benefits of a daily personal growth practice. For the past four years Dr. Richard Bargdill has taken a reading from one of the 81 chapters of the Tao de Ching as well as a reading from one of the 64 I-Ching excerpts daily. In addition, he writes his own commentary for each chapter of the Tao and a comparative American idiom for each I-Ching reading. The numbers corresponding to each excerpt pulled have all been recorded in an excel file to be examined for numerical trends. This personal growth research has provided us with both qualitative and quantitative data to analyze for the purpose of sharing the transformational power of daily meditative practice.

77. To Read or Not to Read; That is the Question

Christopher Latourrette, Depts. of Psychology and Sociology, and Morgan Haas, with Dr. Jeffrey Green, Dept. of Psychology

Do regular leisure readers have a different psychological profile from non-readers? We investigated whether particular positive psychological traits (i.e., greater subjective well-being, self-esteem, meaning in life, and lower loneliness) and leisure motivational variables (i.e., intellectual pursuits or distraction source) would distinguish undergraduate readers from non-readers. In support of a larger ongoing research study exploring the psychological benefits of reading and re-reading novels, we conducted a k-means cluster analysis followed by an analysis of variance to determine the clustering group membership that exists based on various psychological trait measures and motivational factors, and the subsequent effect of the clusters on reading frequency. People with higher positive personality traits, specifically subjective well-being and presence of meaning in life, are more motivated to read leisurely for intellectual gains and as a source of distraction read significantly more often, compared to people with less positive personality traits or who are unmotivated to read for intellectual gains and a source of distraction.

78. An Analysis of the UK and US on the Perceived Adequacy of Workplace Mental Health Programs

Julia Woods, Depts. of Business and Psychology, with Dr Deborah DiazGranados, VCU School of Medicine

Research examining employee provided health benefits typically concentrate on evaluating a program's impact on organizational outcomes such as retention, absenteeism, presenteeism, and cost-effectiveness (Cuffel, Goldman, and Schlesinger, 1999; Munz & Kohler, 1997). The typical methods used for evaluation of these programs tend to be quantitative in nature, however, qualitative methods could help organizations better understand how its employees react to and view such programs. This paper explores employee's perceptions of health benefits provided by employers, specifically mental health programs, within the United Kingdom and the United States. These countries were chosen because of perceived similarities in culture, labor markets, views of the parity of mental and physical health care, and focus on individual's rights. A review and analysis of major categories of mental health programs were conducted to best capture the cultural context, effectiveness, and employee perception of employee health benefits. The search for literature primarily included online searches of the following databases (e.g., Google Scholar, PsychINFO, PubMed, PsycNET) for literature published between 1995 and 2019.

The following key terms were used in different combinations: Mental health programs, mental health benefits, adequacy, employer-provided programs, employee satisfaction, employee perception, either the United Kingdom or the United States. In addition, to highlight a few common employer-provided mental health benefits a targeted search was done for specific benefits (e.g., employee assistance programs, workplace counseling, cognitive behavior therapy, mental health insurance/coverage, and stress management interventions) in combination with the previously listed terms. The initial search resulted in eight publications that were then used for a manual secondary search of reference lists which resulted in three additional publications that were used for the review. Results of the analysis of sources indicate that employer-provided benefits improved employee's mental well-being, which in turn impacted their work. Interestingly, one study conducted by Elliot and Williams (2002) reported comments like "I haven't had any panic attacks since counseling ended," and "my workload is now being dealt with more quickly" by counseling clients. Qualitative reports such as these are particularly interesting when trying to understand how employees view their work after they conclude a mental health program. Future research should consider examining questions such as: 1) what is the overall and longitudinal impact on employee well-being from employer-provided mental health benefits, 2) how do employer-provided mental health programs influence personal well-being, and how does an employee's personal well-being in turn influence employee productivity, and 3) how do cultural differences and a country's approach to mental health care inform the employee's availability/accessibility to mental health care at work.

79. Examining the Relationship Between PTSD Symptom Clusters and Drinking to Cope Motives on Drinking Outcomes

Fatima Tariq, Dept. of Psychology, with Dr. Christina Sheerin, Dept. of Psychology and Virginia Institute for Psychiatric and Behavioral Genetics

Posttraumatic stress disorder (PTSD) is prevalent among combat veterans, and its symptoms are categorized (in DSM-IV) in clusters of: reexperiencing, avoidance, and hyperarousal. Alcohol use disorder (AUD), often preceded by risky drinking behaviors such as binge drinking, and PTSD comorbidity is especially common in veteran populations. One theory underlying this comorbidity is that individuals use alcohol to self-medicate PTSD symptoms. Extant literature more often examines the relation on PTSD symptom severity as a unitary construct rather than on individual symptom clusters, a gap the present study attempts to fill. The aims of this study were to examine whether PTSD total symptom severity and each symptom cluster had significant main effects on a range of alcohol use outcomes (total frequency, binge drinking, and risky drinking) and determine whether self-reported drinking to cope motives moderate the relationship between PTSD symptoms and alcohol use outcomes. It was hypothesized that a) the hyperarousal symptom cluster would most strongly predict alcohol outcomes, as compared to other clusters, and b) drinking to cope would moderate the relationship between PTSD symptoms on alcohol use outcomes, such that those who reported greater drinking to cope motives would endorse higher severity of alcohol use. The present sample (N = 211) consists of a combat trauma-exposed subsample of individuals from a larger study of OIF/OEF veterans (90.5% male, 70.1% white, 70.1%) assessed for PTSD, determined through clinical interview with the Clinician-Administered PTSD Scale for DSM-IV. Participants also completed the drinking to cope subscale from the Drinking Motives Questionnaire (DMQ-Cope) and the Timeline

Followback measure (TLFB; with outcome measures including total number of drinks per month, risky drinking status, and total number of binge days). Analyses consisted of a series of separate hierarchical regression models, with PTSD severity scores (total and symptom cluster) entered in Step 1, DMQ-Cope entered in Step 2, and their interaction entered in Step 3. Linear regressions were conducted for the continuous number of drinks per month, a logistic regression was conducted for risky drinker status, and a negative binomial regression was conducted for number of binge drinking days. In the linear regressions examining whether total PTSD symptom severity and each symptom clusters had significant main effects on total number of drinks per month, while all PTSD severity scores were initially associated in Step 1 with total alcohol use (all p s < 0.02), when DMQ-Cope was added to the model (Step 2), they were no longer significant. In the final step (Step 3), DMQ-Cope showed main effects (all p s < 0.001), but there were no significant interaction effects found (all p s > 0.15). The pattern for both risky drinking status and number of binge drinking days was the same. PTSD total and cluster scores were not associated with either outcome in any of the Steps (all p s > 0.35), DMQ-Cope showed a main effect in all models (all p s < 0.003), and no interaction effects were found (all p s > 0.107). The current findings show that across all alcohol use outcomes, drinking to cope is a strong predictor of alcohol use outcomes, over and above the impact of PTSD symptoms in this sample. Drinking to cope has been independently associated with both PTSD and alcohol misuse and the current study's findings add to the existing literature. Contrary to hypotheses, however, hyperarousal symptoms were not associated with alcohol use outcomes and no moderations were found. Limitations include limited diversity within the sample and future research would benefit from examination in civilian populations, extension to different types of traumas, and examination of other alcohol use outcomes, such as risky drinking behaviors and problems.

80. The Eco-Martyrs of 2018 and Maslow: Is Self-Actualization Only for Colonizers?

Johanna Guz-Montgomery, Dept. of Psychology, Ian McFadden, Victoria Bee, Ashley Sanico, William Purrington, Christopher Latourrette, Rachel Creed, Kelly Rios-Santos, and Alan Lankford, with Dr. Richard Bargdill, Dept. of Psychology

Every year the Global Witness organization compiles and releases a list of forest, earth, water and animal protectors who have been murdered while defending the earth and people. There have been about 2000 "eco-martyrs" since 2002. Most of these persons are farmers, indigenous people, nature lovers or in other words--ordinary people. In their efforts to stop projects that would lead to further environmental destructive and increased climate change, these persons have stood up to governments, militaries, corporations which have attempted to intimidate them. Most of our 'eco-martyrs' had been previously threatened with violence and murder. Many have sought protection from authorities, although almost none have received any and if they did it was clearly ineffective. Our undergraduate research group lead by Dr. Richard Bargdill has constructed short summaries on each of the 2000 names over the last 3 years. We have been humbled by the courage and tenacity of this group of people who in the end represent the best that humanity has to offer. Yet, we noticed that according to our understanding of the Hierarchy of Needs put forth by Maslow that many of these eco-martyrs would not qualify as self-

actualized since most live in nations that do not provide the lower needs. Last year we found exemplary cases from our eco-martyrs where from their brief biographies we could be certain that they exhibited at least one of the 16 qualities and did that for 16 cases. At a poster session we were approached by Maslow scholar Andrew Bland and given the suggestion that our understanding of Maslow's Hierarchy of Needs was not complete. For this year's presentation we would like to both address Dr. Bland's constructive criticism and also share 16 eco-martyrs stories all of which were murdered in the 2018.

81. Health Disparities among Latinx Communities: Issues of Access to Information, Interpreters, and Bilingual Providers

Shea Wenzler, Depts. of Psychology and Political Science, Roma Kankaria, Sydney Welles, and Anubhav Thapaliya, with Dr. Indira Sultanić, School of World Studies

Members of the Latinx community in Richmond and the United States face challenges in obtaining equitable health care access because of socioeconomic and systematic barriers within the healthcare system. This analysis conducted by the Collective Corazón—a VCU student organization that addresses Latinx healthy equity through service and advocacy—examines the underlying causes of Latinx health disparities. Special emphasis is placed on access to just, equitable, and ethical care, information, qualified interpreters, and bilingual healthcare providers—with the objective of proposing viable solutions to alleviate health disparities. This study found that while the U.S. Census Bureau identifies the Latinx population as the fastest growing demographic in the country, the group's average income and educational attainment fall below the national average, causing increased amounts of stress and thus contributing to poor mental and physical health outcomes. The health disparities created by these socioeconomic factors are further exacerbated by discrimination by healthcare workers and language barriers that result from a lack of qualified interpreters and bilingual providers. This situation creates a cultural divide in which Latinx individuals who are less comfortable speaking English are more likely to turn to alternative forms of support, such as religious and community institutions. This study contends that increasing physician and interpreter training, designing and delivering culturally specific eHealth and Telehealth tools, connecting language access to patient safety and quality of care, and encouraging connections with community leaders are ways to lessen the challenges faced by Latinx individuals in healthcare.

82. Benefits of a Daily Personal Growth Activity: An Autoethnographic Study

Maria Ribera Sites, Dept. of Psychology, and Carolyn Renao, with Dr. Richard Bargdill, Dept. of Psychology

The aim of this poster will be to describe autoethnographic research evaluating the benefits of a daily personal growth practice. For the past four years Dr. Richard Bargdill has taken a reading from one of the 81 chapters of the Tao de Ching as well as a reading from one of the 64 I-Ching excerpts daily. In addition, he writes his own commentary for each chapter of the Tao and a comparative American idiom for each I-Ching reading. The numbers corresponding to each excerpt pulled have all been recorded in an excel file to be examined for numerical trends.

Autoethnographic work must consist of five key features, which are included in the research we plan to present. First, there should be at least one participant in the study who is also a researcher. Second, the study must utilize methodological reflexivity suggesting that there is a framework that the researcher intentionally brought to the experience.

Third, there is a clear narrative presence in any written texts meaning that the researcher/participant's experiences are being described or elaborated upon. Fourth, the primary researcher shares the information so that it is not a private project, and the research should be dedicated to an agenda of empirical analysis aimed at enhancing a theoretical understanding of wider social phenomena. This personal growth autoethnographic research has provided us with both qualitative and quantitative data to analyze for the purpose of sharing the transformational power of daily meditative practice.

83. The Impact of Submersion on the Quantification of Host and Bacterial DNA

Grace Sprouse, Depts. of Forensic Science and Chemistry, with Dr. Catherine Connon, Dept. of Forensic Science and Dr. Baneshwar Singh, Dept. of Forensic Science

Microorganisms, which contribute to carrion decomposition, can be used as a clock to estimate time since death. There has been an increase in the amount of studies looking into how bacteria can be used to estimate time since death. Much of this research has been aimed at examining how microorganism communities can be used to determine post mortem interval (PMI) in land environments, for example, research completed by Finley et al¹, which focused on how microorganism communities differ on corpses and in the soil surrounding the body. Finley et al¹ research was used to see how these quantities can be used to determine PMI. However, the comparison between 16S rDNA and nDNA has not been explored. Changes in bacterial DNA quantity may inform researchers on feasibility of using bacteria on remains to estimate the postmortem interval (PMI) and postmortem submersion interval (PMSI). It could also provide insight regarding bacteria: host nDNA ratio, guiding decisions on best methods for victim ID (i.e., microbe based PMSI estimation or DNA profile development). Therefore, this research sought to compare bacterial DNA (16S rDNA) to host nuclear DNA (nDNA) recovered from long-term submerged skeletal elements (e.g., rib and scapula) using two different extraction methods (e.g., organic-phenol chloroform and solid-phase). Using 10" x 10" cages, each containing five ribs and scapulae, samples were submerged in a freshwater lake (e.g., Henley Lake) and river (e.g., James River). Approximately ca. 250 accumulated degree days (ADD), one cage was collected, totaling nineteen lake and twenty-four river collections.

The resulting 364 samples underwent DNA extraction (e.g., organic phenol-chloroform and ChargeSwitch®) before being analyzed via agarose gel electrophoresis (1.0% agarose gel). Gel visualization was performed to evaluate the separation of DNA bands and assess the quality of the extraction method used on each sample. In preparation for Real-Time qPCR quantification, standard curves were performed. Using the ABI 7500, each sample will be quantified twice, once using bacterial primers focusing on variable region 4 of 16S rDNA and once utilizing FH1733 porcine nuclear primers². This section of the research will continue when the university reopens.

84. Differences on the Use of Emotion Regulation Strategies and Intimate Partner Aggression Between Males and Females

Natalia Rodriguez Romero, Depts. of Psychology and Criminal Justice, with Dr. David Chester, Dept. of Psychology

Intimate partner aggression (IPA) is defined as an attempt to harm one's romantic partner via physical, verbal, or sexual means. It is crucial to determine key factors related to IPA perpetration to further understand the phenomena and reduce its prevalence in society. We explored gender differences in the use of emotion regulation strategies and IPA

perpetration. The emotion regulation strategies examined were reappraisal – the act of reassessing an emotion and its intensity – and suppression – deliberately inhibiting unwanted thoughts, feelings, emotions, and associated behaviors. It was hypothesized that males would report higher levels of IPA perpetration than females. Moreover, that there would be a negative relationship between reappraisal and IPA perpetration, and a positive relationship between suppression and IPA perpetration. Undergraduate students (N = 543) completed three intimate partner aggression self-report scales. There was support for hypothesis 1, however it was in the opposite direction to what we preregistered. Women reported more IPA perpetration than men. Additionally, we found that overt aggression had a negative relationship with reappraisal, such that greater self-reported reappraisal was associated with less overt IPA perpetration. Finally, there was no support for hypothesis 2 and 3; so, gender did not moderate the link between either emotion regulation strategy on IPA perpetration. These results indicated that use of reappraisal and suppression emotion regulation techniques did not significantly differ among women and men. More research should be conducted to determine causal factors leading to gender differences in IPA perpetration. These data will aid in determining what interventions to apply to particular groups, and in turn help reduce the occurrence of IPA.

85. The Role of Acting with Awareness on Sleep Quality and Difficulties with Emotion Regulation

Victoria Rabii, Depts. of Psychology and Biology, with Dr. David Chester, Dept. of Psychology

About 60% of college students experience difficulties with proper sleep quality. Poor sleep quality challenges one's ability to effectively regulate emotions, especially in college-aged adults. Emotion regulation, defined as the strategies utilized to alter or manage the experience of intense emotions, is beneficial to our health and social relationships. Mindfulness, how we focus our attention on internal feelings and emotions in relation to external experiences, can assist in understanding the link between sleep quality and emotion regulation ability. Without proper balance between the two, this maladaptive emotional management is likely to be heightened in addition to reducing internal resources that ultimately worsen self-control. In the present study, we predicted that there will be a positive relationship between poor sleep quality and difficulties in emotion regulation. Additionally, this link will be explained via a facet of mindfulness termed acting with awareness. Undergraduate students (N=471) completed self-report measures of sleep quality, emotion regulation, and mindfulness. Findings indicated that our hypotheses were supported, as poor sleep quality was discovered to be positively correlated with difficulty in emotion regulation through the indirect effect of less acting with awareness. Significant implications may be evident in mindfulness interventions aimed at improving the process behind effective emotion regulation. Additional support for the role of sleep within these concepts allow for further emphasis on better quality and quantity of sleep to yield enhanced cognitive controls (e.g. information processing, impulse control). Future research should focus on specific mindfulness strategies that highlight the importance of better self-awareness during behavioral decision making. Examining differences in the use of emotion regulation strategies for those living with sleep disorders or general, consistent disturbances should also be considered.

86. Drugs and the Music Industry: How the Neurological and Visual Effects of LSD and Psilocybin Impact Creativity and Songwriting Abilities

Ammar Jawad, Depts. of Biology and Chemistry, with Prof. Mary Boyes, VCU Honors College

The 5-hydroxy-tryptamine 2A receptor, 5-HT_{2A}, is a G protein-coupled receptor that belongs to a subtype of receptors known as serotonergic receptors. The 5-HT_{2A} receptor plays a wide variety of roles that are pivotal in the optimal functionality of the brain, such as mediating the neurological, visual, and auditory pathways of the central nervous system. Typical agonists of the 5-HT_{2A} receptor include psychedelic or hallucinogenic drugs such as LSD, psilocybin, and N, N-Dimethyltryptamine (DMT). Psychedelic drugs in particular have been a means for many artists and musicians to further enhance their creativity, leading to a subgenre of music and instrumentation known as psychedelic music, or psychedelia. Typically, psychedelic music is characterized by feelings of depersonalization and derealization, and artists who've experimented with drugs such as LSD and psilocybin claim to have an expanded imagination, along with a heightened sense of creativity and mesmerism. The research presented in this study explores the overlap between music and psychedelic drugs, namely LSD and psilocybin, and how the 5-HT_{2A} receptor engages and mediates the neurological as well as the biological effects of these substances. This study has concluded that further research is necessary to explore the possibility of activating the 5-HT_{2A} receptors with substances that do not carry the harmful effects that drugs such as LSD and psilocybin do.

87. Aesthetic Chills: An Autoethnographic Study

Jessica Turner, Dept. of Psychology, with Dr. Richard Bargdill, Dept. of Psychology

The purpose of this poster is to describe autoethnographic research that recorded experiences of aesthetic chills. Aesthetic chills are a psychophysiological response to stimuli that create pilo-erection and a "chill" effect on the body not related to temperature (i.e. goosebumps due to experiences of beauty). For the last two years, the researcher has made a written record of each instance of his experience of an aesthetic chill and the circumstances that triggered the chill. The data consists of brief descriptions of the triggering event, the date the chill occurred. Some descriptions also include the location where the chills were experienced on the body (i.e. back of the neck) as well as the intensity of that chill (mild, intense, pulsar). The encounters have been analyzed for similarities in conditions and given a number in numerical order of the date it was recorded. This research has provided both quantitative and qualitative data to analyze for the purpose of understanding more about the how frequently and under what thematic categories the aesthetic chills occur for this researcher.

According to Denzin (2008) analytic autoethnography has five key features. It is ethnographic work in which: (a) The researcher "is a full member in a research group or setting" meaning that the researcher is also the participant (b) The researcher "uses analytic reflexivity;" the researcher is researching one's own experience and has decided in advance how to capture that experience. (c) The researcher "has a visible narrative presence in the written text." That is, the data is a record of the researchers experience and contains one's personal knowledge. (d) The researcher "engages in dialogue with informants beyond the self." The data is to be shared with other researchers of the topic and his research team. e) Researcher "is committed to an analytic research agenda focused on improving theoretical understandings of broader social phenomena." The research is intended to answer questions about whether recording aesthetic chills increases one's sensitivity to them and thus increases their frequency.

Dr. Bargdill is the autoethnographer since he is both author and focus of the research. He is the one who narrates his experiences as the observer and the observed. By being able to

incorporate himself into the research, he is able to tie together the personal aspect of the culture, thinking and observing as an ethnographer and both the writing and describing as a storyteller and researcher.

88. Identification of Alternative Transcription Start Sites that Generate Neuron-Specific *nhs11b* Isoform that Regulates Neuron Migration

Abanoub Bector, Depts. of Biology and Chemistry, with Dr. Sarah Golding, Dept. of Biology

A recently identified novel gene, *nhs11b*, has been shown to be necessary for the caudal tangential migration of facial branchiomotor neurons (FBMNs) as an effector of planar cell polarity (PCP) signaling. The role of *nhs11b* in regulating neuron migration remains unknown. *Nhs11b* has six variants, termed *ex1nhs11b*, *ex1anhs11b*, *ex1bnhs11b*, *ex1cnhs11b*, *ex1dnhs11b*, and *ex1enhs11b* in exon 1 that then splices into the common portion of the transcript (exon 2 to exon 8). Each isoform has its own transcriptional start site (TSS) and 5-prime UTR region. Here we examined the spatial expression patterns for the six *nhs11b* variants and investigated their role in FBMN migration. In order to determine the spatial expression pattern for each isoform, we performed whole mount in-situ hybridization. We found that all *nhs11b* variants were expressed generally throughout the developing nervous system, including neural progenitor cells. An exception was the *ex1dnhs11b* that exhibited an enrichment in FBMNs, suggesting that *ex1dnhs11b* is a neuron-specific isoform of *nhs11b*. To determine whether *ex1dnhs11b* was required for FBMN migration, we generated de novo mutations in *ex1dnhs11b* using CRISPR/-Cas9 genome editing. We found that an *ex1dnhs11b* mutation can lead to a severe migration defect of motor neurons consistent with the idea that *ex1dnhs11b* is a neuron-specific isoform.

89. Motor Evoked Potential Recruitment Curves Indicate Neuroplasticity after Spinal Cord Injury

Yasmina Zeineddine, Depts. of Biomedical Engineering and Anthropology, with Thibault Roumengous, Graduate Student in Biomedical Engineering, and Dr. Carrie Peterson, Dept. of Biomedical Engineering

Introduction: Motor evoked potential (MEP) recruitment curves in response to transcranial magnetic stimulation across a range of stimulation intensities can provide insight into the condition of neural pathways to a muscle. Further, corticomotor reorganization associated with recovery of motor function may be reflected in changes in the MEP recruitment curve. At low TMS intensity, the MEP often consists of a single direct wave, whereas at higher stimulus intensities, the MEP amplitude increases due to recruitment of later indirect waves (I-waves). These late I-waves are thought to depend on trans-synaptic activation of corticospinal axons through excitatory interneurons. [1] In impaired patients, MEP recruitment curves can inform the development of individualized rehabilitation treatments, as curve irregularities can reveal specific deficits, and enhance our understanding of the neuroplastic changes that occur after injury. In comparing the biceps brachii recruitment curve of subjects with cervical spinal cord injury (SCI) to nonimpaired individuals, we hypothesized that individuals with SCI would have greater biceps excitability, and therefore greater RC slopes, due to the biceps cortical representation growing in response to triceps paralysis [2]. **Materials and Methods:** Ten nonimpaired (4 female, 6 male) and 5 impaired (3 female, 2 male) subjects consented to participate in the study. Subjects were seated and had their dominant arm positioned at a 90° elbow angle. EMG surface electrodes were placed on the biceps after being cleaned with alcohol wipes. The biceps cortical hotspot was determined as the area over the motor cortex where TMS evoked the largest MEP response.

The resting motor threshold (RMT) was the lowest stimulus intensity required to elicit a 50 μ Vpp MEP response in 3/5 trials. TMS was performed with a 126 mm diameter double cone coil and Magstim BiStim2 . MEPs were recorded from the BB and normalized by dividing by Mmax. Recruitment curves were recorded at stimulus intensities ranging from 80%- 160% of subject RMT in 10% increments. Pulse intensities were randomly administered with interstimulus intervals of 10 s. The data was recorded using Spike software and processed in Matlab. MEPs were excluded if they exceeded ± 3 standard deviations of the mean response per intensity. **Results and Discussion:** The recruitment curve slopes for individuals with SCI, on average, were greater relative to the slopes of nonimpaired individuals. This was based on an analysis of MEPs between intensities of 100% and 140% RMT, wherein the slope was on average 5.13 across individuals with SCI, and 1.49 in the nonimpaired population. The greater slope in individuals with SCI suggests enhanced excitability of the biceps, which is consistent with previous studies showing greater cortical representation of non-paralyzed hand muscles relative to paralyzed muscles [2]. **Conclusions:** Our results indicate that cervical SCI promotes greater excitability in the muscles controlled by nerves rostral to the location of injury, and demonstrate neural plasticity following injury. The steeper slopes in individuals with SCI indicate greater recruitment of later I-waves. Whether increased recruitment of later I-waves is associated with greater cortical map area is unclear and will require further investigation.

90. Implementing HSR Infrastructure In The United States To Improve Sustainable Development

Martin Gonzalez, Dept. of Biology, with Dr. Sierra Beecher, Dept. of Biology

The United States has a need to improve sustainable development, which impacts the economy, society, and environment. High speed rail (HSR) funding and infrastructure can help the United States become much more sustainable within cities and surrounding areas. However, the United States has been trailing behind other countries when it comes to supporting HSRs. (Chakrabarti and Foster, 2013) The funding appropriated to mass transit systems have been disproportionately allocated to other mass transportation infrastructures and maintenance; and particularly under funding to HSRs (Chakrabarti and Foster, 2013). Since there is a lack of interest in having HSRs in the United States, the research conducted is used to highlight the importance and benefits of having HSRs. Most studies that have been conducted in other countries explained the benefits from HSRs that impacted capital gain, societal statuses, or environmental factors; however, they never focused on all three sustainable development factors at the same time. The conclusions from the articles state that HSRs have produced overall improved capital gain to cities and nearby towns. (Bracaglia et al., 2020, Yang et al., 2019) They also have much less land use and CO2 emission, when compared to other mass transit systems; and have provided transportation convenience to surrounding areas outside the cities (D'Alfonso et al., 2016, Herala, 2003, Robertson 2016). With these findings the United States can implement either an HSR infrastructure program in the east coast or set up an agency that can oversee the infrastructure and maintenance of HSRs to confidently boost sustainable development benefits.

91. The Impact of Acculturation on Help-Seeking and Mental Health Among Refugees in Minnesota

Analyne Escobar, Depts. of Social Work and Psychology, with Dr. Hyojin Im, School of Social Work

This study looks at how acculturation affects mental health and help seeking attitudes among refugees in Minnesota. There is a need to address high levels of acculturative stress, mental health, and a lack of trust with human services for this population. Secondary data was utilized from the University of Minnesota Survey of Housing Questionnaire, with those identifying as Librarian, Oromo, Karen, Hmong, and Somali, for this study. A Pearson's Correlation test was used to measure the relationship between acculturation and mental health and an independent sample t-test was used to measure the mean difference between those who responded yes and those who responded no to language being a barrier to help seeking attitudes. There was a positive correlation between anxiety/ depression and acculturation (the longer a person stays in the U.S.). Language barrier was also a predictor of the lack to seek help from social service providers.

92. Gender and Ethnic Differences in Sound Tolerance

Nicole Concepcion, Depts. of Psychology, Social Work, and Human Resource Management, and Rachel Wallace, M.S., Dept. of Psychology Graduate Student, with Dr. Scott Vrana, Dept. of Psychology

Misophonia, hyperacusis, and tinnitus are related to decreased sound tolerance (DST). Misophonia is characterized as strong aversive reactions to specific sounds. Hyperacusis is a heightened sensitivity to certain sounds below the loudness sensitivity levels. Tinnitus is a condition that includes continuous ringing or buzzing in the ears. Current research has shown that misophonia symptoms have many commonalities with psychiatric diagnoses and these symptoms result in substantial functional disability and lower quality of life. In the growing literature, there are some questions that need to be answered. The questions sought to be answered in this study are: what is the prevalence of the DST conditions? Are there any significant ethnic and gender differences for those who endorse misophonia, hyperacusis, or tinnitus? Can these differences be corroborated by current health items, like anxiety? To answer these questions, a large scale survey (n= 1,200) was examined by conducting chi-square, independent samples *t*-test, and ANOVA analyses. The findings indicate there were significant gender and racial differences among hyperacusis and misophonia. Women reported more negative responses towards misophonia and hyperacusis. This is consistent with the past findings that women report higher anxiety. White participants endorsed all DST conditions more than any other group. These findings promote further research.

93. There's More to Sleep than Counting Sheep: A Cross Sectional Analysis of Sleep Health

Elizabeth Torres, Depts. of Psychology, Biology, and Chemistry, Sanika Lawate, Hali Russell, and Emily Donovan, M.S., and Pablo Soto, Dept. of Psychology Graduate Students, with Dr. Joseph Dzierzewski, Dept. of Psychology

Background: Studies have supported the claim that good physical health and positive affect have a lasting positive impact on the body and the brain across all age groups. High levels of activity and positive affect can boost immunity, increase life expectancy, and promote resiliency. Studies have also shown that poor physical health and low affect can negatively impact sleep quality. While the associations among physical health, affect, and sleep have been examined, the present study aims to extend these findings to sleep health, a newly developed construct which aims to emphasize the benefits of sleep, rather than the negative effects of the absence of sleep. The purpose of this study is to determine the predictive power of affect for sleep health above and beyond age and physical health, in a

large sample of adults. **Methods:** Data from this study were drawn from a larger online survey investigating sleep and health outcomes across various developmental stages. In this study, physical health, affect, and sleep health were self-reported. Sleep health was measured using the RU-SATED, and affect was measured using the Positive and Negative Affect Schedule (PANAS). Physical health was measured as the total number of self-reported medical conditions from a list of common conditions. A hierarchical linear regression was conducted, with age in block 1, physical health in block 2, positive and negative affect in block 3, and sleep health as a dependent variable. **Results:** A three-level hierarchical linear regression was computed to investigate if affect predicted sleep health above and beyond age and physical health. When age was entered, it predicted sleep health, $F(1, 3282) = 61.87, p < .001, R^2 = .019$. This initial model revealed that 1.9% of the variance in sleep health was predicted by knowing the participant's age. When physical health was entered, it predicted sleep health, $\Delta F(1, 3281) = 78.53, p < .001, \Delta R^2 = .023$. This model revealed that an additional 2.3% of the variance in sleep health was predicted by knowing the participant's physical health. When positive and negative affect were added to the model, they significantly improved prediction, $\Delta F(2, 3279) = 178.26, p < .001, \Delta R^2 = .094$, revealing that an additional 9.4% of the variance in sleep health was explained by positive and negative affect. All variables together significantly predicted sleep health outcomes, $F(4, 3279) = 128.43, p < .001, R^2 = .135$, with 13.5% variance in sleep health explained. In the final model, age ($\beta = .10, p < .001$), physical health ($\beta = -.09, p < .001$), positive affect ($\beta = .17, p < .001$), and negative affect ($\beta = -.24, p < .001$) were significant predictors of sleep health. **Conclusion:** The current study suggests that affect predicts sleep health above and beyond age and physical health. Greater positive affect and fewer chronic health conditions are associated with better sleep health. Inversely, greater negative affect and more chronic health conditions negatively are associated with worse sleep health. Therefore, people who have higher negative affect (i.e., negative emotions, including anger, contempt, disgust, guilt, fear, and nervousness as well as low self-concept) report poorer sleep. Future studies would benefit from a longitudinal design to examine the associations among positive affect, physical health, and sleep health over time. Moreover, studies could incorporate clinical samples with chronic medical conditions to further explore the associations among affect, physical health, and sleep health. Given the strong association between affect and sleep health, future studies could also explore interventions that foster positive affect to see if manipulation of affect improves sleep health.

94. The Stages of Justice: Sketching the Sculpture of William Rush

Jae Ricketts, with Dr. Bernard Means, Dept. of Anthropology

This poster displays a portion of the illustrative work that I did for Dr. Bernard Means at VCU's Virtual Curation Lab (VCL). Using 3D scans procured by Dr. Means, I was able to create sketches of the work of William Rush, an American neoclassical sculptor. My poster focuses specifically on the illustrative process that I went through when drawing Rush's sculpture called Justice. Dr. Means' scans of Justice, made publicly available on the VCL's Sketchfab site, allowed me to complete this project remotely. Many 3D models can be interacted with, manipulated, or viewed from multiple angles, all while maintaining a perceptible level of detail. Not only does this fact allow for remote study by scholars and artists, but it also opens up new possibilities for virtual education. Digital media, such as 3D scans and models, could provide viable answers to questions of geographic accessibility in educational institutions such as museums and universities.

95. Polo-Like Kinase 1 Mediated Regulation of Androgen Receptor: Potential Role in

the Development of Castration Resistant Prostate Cancer

Xavier Moore, Depts. of Chemistry and Biology, with Dr. Zheng Fu, Ph.D., Department of Human and Molecular Genetics

Brief Description:

Primary therapy for advanced prostate cancer (PCa) is androgen deprivation therapy. This therapy is effective for generally one to two years, however, the disease then progresses to lethal castration-resistant prostate cancer (CRPC). There is significant interest in determining the molecular underpinnings of this transformation. Preliminary data suggests that polo-like kinase one (PLK1) may play a role in the development of CRPC. This study seeks to investigate if PLK1 interacts with the androgen receptor and to characterize the functional significance of such an interaction.

Abstract:

The advancement to castration-resistant prostate cancer (CRPC) brings a ubiquitously terminal prognosis. Incomplete understanding of the molecular driving forces of this transformation hinders the development of novel therapeutics to treat lethal prostate cancer (PCa). Herein, we provide preliminary evidence that polo-like kinase 1 (PLK1) and the androgen receptor (AR) interact endogenously, resulting in PLK1-mediated phosphorylation. These data, among other publications, provide evidence that PLK1 may be involved in the development of terminal PCa and justify further investigations to delineate the functional significance of this interaction. Comprehensive characterization offers the potential for novel therapeutic avenues in the treatment of castration-resistant prostate cancer.

96. Economical Custom-Made 3D BioPrinter

Lucas Craft, Depts. of Electrical and Computer Engineering & Physics, with Dr. Daeha Joung, Dept. of Physics

Bioprinters are used to extrude biomaterials that contain living cells to develop synthetic organ and tissue models. Being able to 3D bioprint these models allows us to build the small intricate structures that mimic complicated living organs. As of now, the technology is expensive, with the average bioprinter exceeding ten thousand dollars. The high price often makes this tool a high-risk investment for many biomedical companies and researchers who may want to use this technology for research. Fortunately, the components that make a bioprinter could become inexpensive, especially with the open-source environment 3D printers have become. Altering the firmware and mechanics of a 3D printer can be relatively simple. To make a cost-effective bioprinter, inexpensive 3D printer parts can be used to make the system necessary for bioprinting. For this system, a one-hundred-dollar 3D printer (Fused Deposition Modeling based) is used for the XYZ movement and machine control from the included motherboard. A holder was designed for two pipettes to replace the plastic extruder the inexpensive printer came with. The biomaterials (including cells and hydrogels) are extruded out of the pipettes using air pressure from an air compressor and controlled using thirty-dollar solenoids. To incorporate the pneumatic system with the 3D printer, the open-source firmware Marlin was altered to use a header file (.h file) called Baricuda, which was designed for extruding chocolate for elaborate candy sculptures. Baricuda is used for the extruding system of a bioprinter using air pressure control to push biomaterials through a pipette for extrusion.

Another critical aspect of a bioprinter is maintaining the viability of the living cells, which needs to be at average body temperature (37 °C). For this, an insulation chamber will be made to completely contain the 3D printer so that the heat from the bedplate is used to warm the whole system's environment. A thermistor mounted at the top of the printer will be used to ensure the temperature is maintained. Overall, the cost for a bioprinter like this will be less than one-thousand-dollars, depending on the type of air compressor. Air compressor cost aside, the printer costs approximately three-hundred-dollars, making it far cheaper than the ones on the market today.

97. Oral Health Prevention Interventions Targeting the Latinx Population in United States: A Scoping Review

Anyi A. Rodriguez, Dept. of Forensic Science, with Dr. Dina Tamar Garcia, VCU Health Behavior and Policy

The Latinx population is the second-largest ethnic group in the United States (U.S.). This large and growing population is disproportionately impacted by oral diseases, including Early Childhood Caries (ECC) and periodontitis. They also face several barriers accessing dental care such as lacking a regular source of care, being uninsured/underinsured, and language barriers. Despite the high oral health needs and barriers to dental care present within this population, little has been done to understand the current state of the literature concerning research related to this population. To address this gap in the literature, a scoping review of literature regarding oral health behavior and intervention studies targeting the U.S. Latinx population was conducted following the Arksey and O'Malley (2005) and the Tricco et al. (2018) Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Review Guidelines. Four scholarly databases (Embase, Ovid Medline, DOSS, CINAHL) were searched from inception to December 13, 2019 for peer-reviewed articles published in English or Spanish. Four reviewers independently screened articles at the title-abstract level using Rayyan QCRI software. Articles were included if they focused on the Latinx population in the United States and mentioned oral health. Conflicting decisions were resolved by consensus between the reviewers. A total of 3096 articles were identified through the scholarly databases, of which 31 were duplicates. Initial results from the abstract selection phase yielded 208 of 3065 articles for full-length article review. Articles were excluded because they did not focus on the U.S. Latinx population or mentioned oral health, had a biological focus, or were formats other than research studies (e.g. reviews, editorials, conference abstracts). Full-text review of the articles is currently underway, to be followed by data charting using REDCap. Studies will then be summarized using qualitative synthesis. Results from the scoping review will inform the direction of future oral health prevention intervention research.

98. 3D Modeling of Pediatric Hearts with Congenital Defects

Anthony Gonnella, Depts. of Mechanical Engineering and Mathematics, with Dr. Joao Soares, Depts. of Mechanical and Nuclear Engineering

Introduction: The anatomic complexity and variability of congenital heart disease (CHD) presents unique challenges in three dimensional visualizations between the multiple specialists that can be involved in surgical planning. Gold standard imaging (conventional 2 dimensional echocardiography) requires each team member mentally integrate multiple images to complete one's own mental model. We hypothesize that 3D printed models improve preoperative planning and shared team understanding, **Materials and Methods:** Standard CT and MRI scans were performed on patients at the Children's Hospital of

Richmond (CHoR) as part of their standard of care. Anonymized DICOM files were segmented with 3D Slicer open-source software. Using the threshold by intensity and paintbrush tools, the blood cavities were modeled. Incorrect features in the automated segmentations were manually edited. Subsequently, the myocardium was segmented to obtain wall thickness and a virtual 3D model created. The digital models are then sliced at orientations that best highlighted each congenital defect and converted to an STL file for 3D printing. **Results and Discussion:** Our method confirms the feasibility of creating patient specific 3D printed models that not only integrated the anatomic complexity of a specific patient but also provide the managing team and the family a conceptually clear picture of the anatomy and a springboard to discuss planned surgery. One of the 3D-printed CHD models was presented at the Pediatric Cardiology Conference and was able to help guide the surgical team to plan and pick the most appropriate surgical procedure (with the highest likelihood of a positive outcome) among several different possibilities. **Conclusion:** Our 3D-printed models of CHD improved surgical understanding, perspective, and approach in one patient. This potentially improved the outcome of the surgery, reduced the child's risks, minimized hospital costs, and hopefully eased some of the parent's concerns. The use of 3D-printed models should be explored in other complex CHDs. In addition, it seems to be an extremely elucidative educational tool for the team.

99. The Socioeconomic Barriers and Policy Barriers to Refugee Health

Matt Tessema, Dept. of Journalism, with Dr. Dina Garcia, Dept. of Health Behavior and Policy

There are multiple barriers that make it difficult for refugees to get adequate healthcare and among their largest barriers is meeting their oral health needs. The goal of this study is to figure out what those barriers are, whether it is financial or educational, and how to address it. This will be determined through the use of qualitative data from our semi-structured interview questionnaire. Those that will be interviewed include the health liaisons of refugee camps and the refugees themselves. The subjects will come from the surrounding refugee resettlement camps in the Richmond, VA area. The questions will aim to identify the refugee oral health care habit and their concerns gauging how much knowledge they have around oral health. These interviews will be audiotaped. We will then qualitatively analyze our data.

100. Physiology as a Mechanism Driving Early Fitness Responses in Cornus Florida

Brendan Finnie, Depts. of Biology and Chemistry, and Jane L. Remfert, Graduate Student in Integrative Life Sciences, with Dr. Rodney Dyer, VCU Center for Environmental Studies

Urban encroachment into natural ecosystems can increase the chances cultivar gene escape from the urban environment into natural populations. Cultivar *Cornus Florida*, flowering dogwood, has been artificially selected for traits like larger floral displays, tolerance of high sunlight, and resistance to disease and occurs in close proximity to native populations. A common garden experiment was established to compare relative performance of cultivar and native seedlings in native shade conditions by measuring proxies for fitness. Additionally, physiological measurements were taken as a potential mechanism driving early differential fitness responses of seedlings. Light saturated photosynthesis was measured using a Li-Cor 6400 Portable Photosynthesis System, additionally, proxies for fitness like leaf area, height, stem diameter, and above and below ground biomass were collected. Image J was used to calculate leaf area from digital photos and linear mixed effects models were used to determine differences in plant traits between cultivar and native seedlings. Plant traits including above and below ground biomass were

significantly larger in cultivar *C. florida* seedlings (AGB $P = 0.019$, BGB $P = 0.005$). There was a significant difference in leaf area (cm) from the leaf base to tip between cultivar and native seedlings ($P < 0.001$) but no significant differences were found in mean light saturated photosynthesis between native and cultivar *C. florida* seedlings ($P = 0.792$). The lack of differences in photosynthetic rate between native and cultivar *C. florida* seedlings does not support a physiological mechanism driving differential early fitness response. Differences in early fitness response indicate that cultivar *C. florida* can outperform native seedlings in a shaded understory environment. Thus, it is possible that cultivar genes that escape from urban areas could establish in native populations.

101. Static Degradation of Electrospun Polycaprolactone Scaffolds

Emily Clement, Depts. of Biomedical Engineering and Electrical Engineering, Connor Donlan, Sam Cole, Sarah K. Saunders, and Johana Bracamonte, with Dr. Joao Soares, Dept. of Mechanical Engineering

Introduction: Engineered tissue vascular grafts (ETVGs), composed of cells seeded on a biodegradable scaffold, can be used to replace non-functional blood vessels. The scaffold acts as a replacement for the extracellular matrix, providing structural support to the developing tissue. A common biodegradable scaffold material is polycaprolactone (PCL). The main degradation mechanism of PCL is hydrolysis, which can be catalyzed by the use of NaOH solutions. Acceleration techniques must be employed to obtain information about the degradation in shorter observation times. In this study, we will compare the effect of degradation on physical and mechanical properties from samples degraded in PBS solutions (that mimics the pH of biological environments), and alkaline NaOH solutions. We hypothesize that the accelerated degradation profiles can be correlated to degradation profiles under in vivo like conditions. **Methods:** This study focuses on PCL (PCL 80,000 g/mol) 3mm electrospun scaffolds. Accelerated conditions were produced by submerging the scaffolds in increased NaOH solutions. The weight loss, elastic modulus, and microstructure of the scaffolds were assessed after vacuum drying at 0, 7, 14, 21, and 42 days. Phosphate-buffered saline (PBS) solution was used to replicate physiological-like pH conditions. This group was tested for elastic modulus, weight loss, and thickness at 0, 3, and 6 months. **Results:** The rate of change in mass, fiber orientation, and mechanical stiffness increased as the alkalinity of the liquid media increased to pH 12.45. Changes in the mechanical properties of the scaffolds became noticeable after 3 weeks of degradation. A decrease in mass stiffness was observed following a steep decrease in mass. At 6 weeks of degradation, the samples experienced a 20% decrease from the original mass and a 50% drop in membrane stiffness. The scaffolds swelled shortly after degradation began, but the swelling decreased as the mass decreased. In the non-accelerated degradation group, the scaffolds exhibited an average mass loss of $10 \pm 7\%$ with no significant changes to mechanical properties. The scaffold thickness swelled to $40 \pm 20\%$, aligning with our previous works that showed scaffold swelling decreases at a larger pH. **Conclusions:** If the degradation of PCL scaffolds in physiological pH conditions follows the same trend as those in accelerated conditions, a stage of pronounced decrease in mass will be accompanied by a significant decrease in membrane stiffness and porosity. We hypothesize that the accelerated and non-accelerated degradation profiles are equivalent, meaning accelerated degradation can be used as a base to predict a scaffold's behavior in physiological conditions.

102. Using Asset Mapping to Identify Health Needs of a Latinx Population in Rural Virginia

Sara Debab, Interdisciplinary Science, with Dina Tamar Garcia, Health Behavior & Policy, VCU School of Medicine

According to the Virginia Department of Health, the Commonwealth's Latinx population sees worse health outcomes compared to other ethnic groups in the state. Latinx living in rural areas of the state are of particular concern due to federally-recognized physician shortages and various social determinants that exacerbate the situation. We studied Galax, Virginia, a rural city in southwest Virginia that is more than 14% Latinx, a rarity in the Appalachian region. With the city ranking 130th out of 134 cities and counties in the state for health outcomes, an inquiry focused on identifying the health needs of Latinx in Galax was necessary to expand upon very limited data. Asset mapping was conducted to identify available resources that play a factor in the health of residents. Navigating and observing the city through walking and windshield tours allowed us to determine what resources and assets exist in the community that currently address health issues. Through this process we obtained various tangible sources of information that served to assist us in different ways: apart from deriving names of important contacts to conduct key informant interviews with, we obtained various tangible sources of information about available services by numerous government and private organizations. Consequently, we successfully identified the key community organizations and leaders to seek valuable insights from in future key informant interviews.

Our ability to obtain updated and accurate assessments of available resources is evidence of the success of employing asset-mapping methods to identify health needs.



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