



MARCUS

AT RANDOLPH COLLEGE



PRACTICE



SATURDAY, OCTOBER 22, 2022



Welcome to the 24th Mid-Atlantic Regional Conference for Undergraduate Scholarship (MARCUS)

We at Randolph College are proud to be hosting you for this fun and rewarding event. Whether you are a presenter, a faculty sponsor, or guest, we are pleased that you are here participating in our conference.

The **Mid-Atlantic Regional Conference for Undergraduate Scholarship (MARCUS)** was founded and hosted by Sweet Briar College from 1999-2018. Since its inception, MARCUS has attracted students from colleges throughout Virginia and surrounding states, who present their research in various formats, including oral presentations, poster presentations, and our newest category, elevator speeches.

Our conference atmosphere is one of lively inquiry in which the student researchers are the experts, presenting to an audience of their peers. Unlike many conferences, MARCUS is purposely interdisciplinary, with an emphasis on the intersection of disciplines across the liberal arts spectrum. For instance, one presentation session may include students in history, economics, political science, and anthropology, all sharing a research interest in globalization. In another session, the common topic may be preserving species habitats and include presentations in biology, environmental studies, and philosophy.

Please help the student presenters hone their presentation skills by asking questions regarding their scholarship during the questions and answer (Q&A) period following their talk, and be sure to visit the poster presenters who are also eager to share their work.



You are welcome to explore the rest of our beautiful campus.

schedule

SATURDAY, OCTOBER 22, 2022

8:15 - 9 a.m.: Registration - *Main Hall Lobby*

Breakfast - *Quillian Conference Room*

9 a.m.: Welcome and Keynote Speaker - *Nichols Theatre*

WELCOME: HOLLY TATUM

PROFESSOR OF PSYCHOLOGY AND DIRECTOR OF THE CENTER FOR STUDENT RESEARCH, RANDOLPH COLLEGE

KEYNOTE SPEAKER: ERIN HELLER

ASSISTANT PROFESSOR OF BIOLOGY, RANDOLPH COLLEGE

***“Factors affecting migratory shorebirds and their prey during spring stopovers
on Virginia’s barrier islands”***

10:15 - 11:45 a.m.: Oral Presentations - *Nichols Theatre, Klein Boardroom, Psychology Room 101*

Noon - 1 p.m.: Lunch Buffet- *Smith Banquet Hall*

1:30 - 2:30 p.m.: Poster Session I - *Hampson Commons*

Snack break - *Hampson Commons*

2:45 - 3:45 p.m.: Poster Session II - *Hampson Commons*

1:30 - 3:30 p.m.

REGIONAL GRADUATE PROGRAMS FAIR

MAIN HALL LOBBY



oral presentations

Session 1a

Nichols Theater

Moderator: Dr. Peter Sheldon

10:15 a.m. Ursilia Beckles '23, Virginia Tech
10:30 a.m. Kate Campbell '24, Sweet Briar College
10:45 a.m. Shane Lee '22, Virginia Tech
11:00 a.m. Ishita Pai Raikar '25, North Carolina State University
11:15 a.m. Kate Kotany '23, Sweet Briar College
11:30 a.m. Valentina Santos '24, Jedi Kauanui '23, Randolph College

Session 1b

Klein Boardroom

Moderator: Blair Gross

10:15 a.m. Ciara Kocik '23, Sweet Briar College*
10:30 a.m. Grace Jones '23, University of Virginia
10:45 a.m. Craig Caudill '25, University of Richmond*
11:00 a.m. Maddie Swartz '24, Sweet Briar College
11:15 a.m. Gabriel Dudley '23, Randolph College
11:30 a.m. Evelyn Tello '22, Sweet Briar College, *elevator speech*

**changed from published hard copy program*

Session 1c

Psychology Room 101

Moderator: Karin Warren

10:15 a.m. Aunannya Banik '25, Sweet Briar College
10:30 a.m. Taylor McGee '23, Hampden-Sydney College
10:45 a.m. Victoria Harder '24, Sweet Briar College
11:00 a.m. Gabriel Quintero '23, Olivia Richards '23, Randolph College
11:15 a.m. Luke Triplett '24, Duke University
11:30 a.m. Emily Schloss '23, Bridgewater College, *elevator speech*

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abstracts

Oral Presentations, Session 1a: Nichols Theater, Student Center 10 - 11:45 a.m.

Ursilia Beckles '23, Virginia Tech, The socioemotional development of rural minority youth: The black church as social capital

Advisors: Tameka Grimes, Katie Carmichael; Brandon Walsh, University of Virginia

There is an overarching assumption that evangelical conservatives and their families are inherently white. With many black Americans (including Black, Indigenous, Hispanic, Asian, and mixed-race individuals) voting Democrat and leaning left, this assumption does have merit (Kidd et al. 2007). However, there are black families in such conservative spaces and their minority status gives their children a limited voice or limited social mobility. The secular world seems to view these minority families as traitors to their race and culture; the right-wing Christian world views them as second-class community members. Some minority children raised in these spaces find themselves at the forefront of social ills, such as systematic social exclusion and, for minority women, lower self-esteem associated with being a non-white female. This study's premise is to understand better the relationship between participation in predominantly white evangelical institutions by minority rural youth and later socio-emotional outcomes. Additionally, this study will observe the black church in the United States as a possible alleviator for "socially misplaced" black and minority youth utilizing its social capital. By examining socio-emotional outcomes through self-report, analysis of nine participant interviews, and digital mapping, this study hopes to create bonds and friend groups to strengthen rural minority youths' participation in social lives outside their predominantly white "home" institution. The themes emerging from the data analysis were dating difficulty & self-esteem, the obligation to "uphold" one's race in white spaces, public schools vs. private schools, and sentiments around church and faith. This data analysis aims to form potential future individual strategies and programs for improving socio-emotional outcomes.

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Kate Campbell '24, Sweet Briar College, Performance evaluation of 3D printed polymer prostheses simulating the bones' structure

Advisor: Flavia Mendonca

The goal of the research is to determine the mechanical properties of a 3D printed polymer that mimics the bone's structure. This research aims to evaluate how infill density affects the material properties in order to evaluate which infill density would be the most beneficial for a structure mimicking the bone.

Shane Lee '22, Virginia Tech, Load shedding in South Africa: How solar panel deployment can alleviate inequalities

Advisor: Susan Bodnar-Deren

I will explain why solar panel deployment in South Africa is essential in remedying load shedding. I will discuss how load shedding is catastrophic to marginalized black South African communities in rural and township areas. I will explore how the ANC-led government, private businesses, and outside political parties can unite to alleviate energy inequality caused by load shedding. Through my personal experiences as a Gilman Scholar in South Africa, I conducted interviews and used scholarly papers as evidence as to why alleviating South African energy inequality is essential. The implementation of Solar Panels in South Africa is vital, but it must include marginalized communities in order to be successful.

Ishita Pai Raikar '25, North Carolina State University, Media representation of ethical and social issues inherent in autonomous vehicle technology

Advisors: Veljko Dubljevi, George F. List

Successful implementation of Autonomous Vehicle (AV) technology is not only an engineering challenge but a social, political, and ethical one as well. As AVs become more commonplace and begin affecting people's daily lives in a more profound way, media coverage of the social and ethical considerations of these technologies will follow suit. We seek to analyze and categorize the media's portrayal of the social and ethical issues surrounding AVs to better understand how these issues are shaping public debate. Through our efforts, an understanding of these impacts will help inform AV system decisions, not only for vehicle manufacturers, but transport system planners and operators as well. Issues that are most salient—defined by frequency, location, and/or length of coverage in the media—become part of the public discourse and influence public policy. Headline-grabbing events in the development of AVs (e.g., an Uber AV fatality or a Tesla auto-pilot accident) increase public discussion and concern about AV technology risk and safety. The rise in "fake news" is also exacerbating these tendencies and complicating the public dialogue. Our study is a contribution to study public visibility to enhance product development and implementation of AVs steered by public discourse.

Kate Kotany '23, Sweet Briar College, Land use and land cover effects on surface water quality at Sweet Briar

Advisor: Lili Lei

Different land uses and land covers can alter the physical, chemical, and biological properties of surface water, which may cause issues such as water brownification due to increasing dissolved organic carbon and iron. Aquatic macroinvertebrates are often mentioned as good indicators of water quality, but their relationship with water quality parameters still needs to be understood more deeply. This study investigated the effects of different land uses and land covers on dissolved iron and dissolved organic carbon in a small watershed at Sweet Briar College. Samples were collected from 22 locations across the watershed in a week period, including several headwaters and second-order streams with three stagnant water bodies. 8 locations were chosen to collect and assess macroinvertebrates over a month period. Our data showed that surface water tends to degrade when anthropological activities increase compared to the forested areas.

Valentina Santos '24, Jedi Kuanui '23, Randolph College, Using spectral signatures to study benthic microalgal communities

Advisor: Sarah Sojka

The Eastern Shore of Virginia is home to a large and successful seagrass restoration project. This project has restored nutrient cycling and habitat for fish and other marine species. While benthic microalgae are an important part of the seagrass community, little research has been done on the impacts of this restoration on benthic microalgae. A Randolph College Summer Research Program project in 2021 demonstrated that the benthic microalgae living in restored seagrass beds are different from the benthic microalgae living in adjacent bare areas. However, the method used, visual identification of benthic microalgae is labor-intensive, meaning that only a limited number of samples were analyzed. This past summer, we employed a new method using the light absorption characteristics of the pigments in the benthic microalgae to classify the algae. This method has been successfully used in lake systems and allowed us to look at both spatial and temporal differences in benthic microalgae.

Oral Presentations, Session 1b: Klein Boardroom, Student Center 10- 11:45a.m.

Craig Caudill '25, University of Richmond, Revealing resistance: Ralph Perry

Advisor: Ernest McGowan

I will present historical research that I conducted on the life of Ralph Perry. Through the Race and Racism project at the University of Richmond, an interdisciplinary initiative focused on conducting inclusive historical research, I was able to contextualize and discover information about him. Reviewing archives at the Virginia Baptist Historical Society, Library of Virginia, and familysearch.org, I discovered Ralph Perry's story. Perry subscribed to the University of Richmond in 1844, despite being enslaved for the first 30 years of his life. During this time, he was subject to multiple summonses from Loudoun County, Virginia for violating the 1806 Virginia regulation regarding his residency in the commonwealth prior to his manumission. Shortly after the subscription, which was presumably to support a petition to remain in the commonwealth, Ralph Perry migrated to Ohio. The research I conducted depicts an essential intersection of inclusive institutional history and a story of forced migration in the antebellum south. Despite typical institutional history research, Ralph Perry's life extends far beyond campus borders as his story travels from Virginia to Ohio in an unwelcoming political climate.

Grace Jones '23, University of Virginia, Connecting professional guidelines of practice to the cultural climate in statistics

Advisor: Dan Spitzner

This presentation aims to trace the connection between culture and methodology within statistics to understand how the field may work towards developing a climate that is inclusive for people of all identities. The centerpiece of this work is an analysis of ethical guidelines of statistical practice released in February 2022 by the American Statistical Association. The connection between methodology and culture is drawn from the roles objectivity plays in traditional statistical methodologies, especially as they relate to cultural and political values that are associated with the invocation of objectivity. Particular attention is paid to explicit references or allusions to these roles within the ASA's ethical guidelines, which reflect cultural values and norms, and as a result, reinforce certain cultural climates. The presentation subsequently explores how emergent methodologies within statistics challenge and complicate traditional reliance on objectivity.

Ciara Kocik '23, Sweet Briar College, Academic outcomes of Explore Engineering

Advisor: Michelle Gervasio

I worked with Sweet Briar College's Explore Engineering program to create a survey to assess the academic outcomes of the students who participated in the Program. We hoped to prove that bridge programs actually work, as there is not much data on this topic. The process did not go exactly as expected. The scope of the survey's creation was more detailed than we originally thought. In addition, the amount of data we received was a much smaller sample size than was viable for reliable outcomes. We pivoted and set up the data analysis to use in the future when there is enough data.

Maddie Swartz '24, Sweet Briar College, Legacy of a deposed king reevaluating the legacy of Edward II of England (1307-1327)

Advisors: Lynn Laufenberg, Erin Pitt

King Edward the II of England was the first British king to be deposed. This deposition would forever alter the political state of the British Isles. King Edward II is known for this failure, being framed as universally hated by his people to most modern scholars. In reality, his reputation is much more complex. To his enemies, King Edward was seen as a neglectful, tyrannical ruler, while to his supporters he became a martyr and died for what he believed in. By better understanding Edward's conflicting legacy, scholars can have a greater understanding of this era of the Middle Ages. By looking through both historical chronicles and archaeological records, I seek to shine a light on what Edward's legacy truly is.

Gabriel Dudley '23, Randolph College, Drum Corps International experience

Advisor: Susanne Bessenger

My presentation is about my summer experience with a Drum Corps International tour. I navigated the difficulties of touring along with the many joys of playing music with some of the greatest people I have ever met. Touring up and down the east coast and awakening in different cities was very enjoyable and I have gained knowledge and skills such as how to be more, adaptable, efficient and organized. Being on tour requires an efficient and organized mind and personal space at all times to ensure that a schedule is upheld. The regular daily rehearsals were valuable in that I learned how to stay focused while maximizing quality of performance. This, to choose one example, has carried over into my everyday life by helping me stay focused and efficient on my schoolwork. I hope that I can inspire other musicians to follow their musical hopes and dreams.

Evelyn Tello '22, Sweet Briar College, Impact of pesticides on the life history of Painted Lady butterflies

Advisor: Megan Kobiela

Painted Lady butterflies (*Vanessa Cardui*) are unique because their number of host plants are almost triple the amount available to any other Virginia native butterfly. While they favor plants in the family Asteraceae, they consume plants with various chemical compounds that might affect their development and life history. Their development may be further affected by different low doses of pesticides encountered in their environment. We hope to determine whether consumption of various host plants with different chemical compositions alter butterflies' responses to common pesticides, including Azoxystrobin and Clothianidin. We will raise butterflies in a fully factorial design on artificial diets containing host plant material from different plant families (soybean, potatoes, and hollyhock) and sub-lethal levels of pesticides. We will measure various life history traits of the butterflies, including survival, development time, and adult body size. We will also dissect female butterflies to look at changes in egg development. Results from this research will eventually help us understand how butterflies navigate a complex chemical landscape and potentially help inform conservation practices.

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Oral Presentations, Session 1c: Psychology Room 101, 10-11:45a.m.

Aunannya Banik '25, Sweet Briar College, Asymmetric organocatalytic reduction of unsaturated compounds with Frustrated Lewis Pairs

Advisor: Caleb Brown

Frustrated Lewis Pair is a compound or mixture that contains a Lewis acid and a Lewis base that cannot combine to form a classical adduct because of steric hindrance which results in a reactive pocket that is able to activate small molecules such as dihydrogen (Stephan, 2017). Since the work of Sabatier 100 years ago, chemists started using metals to activate H₂ by weakening or cleaving its central bond. This paradigm changed with a 2006 report of a metal-free molecule that reversibly activated H₂ across sterically encumbered Lewis acidic boron and Lewis basic phosphorus sites (Stephan, 2016). Shortly thereafter, similar reactions were mediated by systems described as "frustrated Lewis pairs" (FLPs) that were derived from simple combinations of electron donors and acceptors in which steric demands precluded dative bond formation which lead to metal-free green chemistry (Stephan, 2017). Bulky Amino acid derivatives could lead to the formation of chiral FLP complexes in which the Lewis acid and Lewis base have bulky substituents that prevent them from drawing close enough to each other to form a neutral adduct—the unquenched pair is said to be "frustrated. This steric "frustration" can be utilized to activate small molecules such as dihydrogen.

Taylor McGee '23, Hampden-Sydney College; José Alberto Aguilar Briseño, Jonah Elliff, University of Iowa, Generation of a Cas9-expressing macrophage line to facilitate Ebolavirus research

Advisor: Wendy Maury, University of Iowa

Ebolavirus (EBOV) is a negative-stranded RNA virus endemic to Western and Central Africa, with mortality rates between forty and ninety percent. There are limited effective antiviral treatments, and the efficacy of the FDA-approved vaccine has recently been called into question by evidence of breakthrough infections in the Democratic Republic of Congo. Macrophages are important cell targets during early EBOV infections. Among the many contributions of macrophages to EBOV pathology are their capacity to serve as vehicles for viral dissemination and to produce pro-inflammatory mediators. However, mature macrophages cannot be easily genetically manipulated to characterize host genes responsible for these activities. Interferon gamma (IFN- γ) is highly protective against EBOV infection in macrophages but mechanistic means by which this protection is mediated remains unclear. To study antiviral host responses mediating the effects of IFN- γ , we identified a murine Kupffer cell line that recapitulates most characteristics of primary mature macrophages. A Cas9 gene was introduced into murine Kupffer cells in preparation for the knockout of genes to improve the mechanistic understanding the protection IFN- γ can provide. We successfully developed this important cellular reagent for future studies to elucidate host genes in macrophages that control EBOV infection.

Victoria Harder '24, Sweet Briar College, Community resilience to climate change through local climate policy in Lynchburg, VA

Advisor: Lisa Powell

This project explored a working definition of what Community Resilience is and how it is being affected by climate change through the literature and how this can be applied in a case study method to local climate policy. I explored what a possible definition and framework for local climate policy could be and began exploring a working definition for what "local" is through scholarly publications. This definition led to using the city of Lynchburg, Virginia as a case study due to its smaller size and relationship to the surrounding counties of Amherst, Appomattox, Bedford, and Campbell both socio-economically and environmentally. I performed a coding process on Lynchburg's Ordinances to begin examining what policies they have in place and how these fit into the framework that has been created from the literature.

Gabriel Quintero '23, Olivia Richards '23, Randolph College, Old-growth forest assessment and carbon storage estimation methods with the 500-Year Forest Foundation

Advisor: Karin Warren

Non-profit conservation organizations can play a key role in working with landowners to preserve and restore mature forests. The 500-Year Forest Foundation mission is a 501c3 non-profit organization that works in partnership with private landowners to conserve mature forests and the biologically diverse species they nurture. Prospective 500-Year Forests generally contain a minimum of 100 acres and a significant number of trees of 70 years or older, minimal evidence of human disturbance, and indications that the site's quality will support a trajectory to an old growth forest. Designated 500-Year Forests are protected by conservation easements or amendments to existing conservation easements that provide these protections for the forest. Randolph College undergraduate researchers have been working with the 500YFF since 2019. In 2019, we developed a baseline protocol and conducted forest inventories at three 500YFF forests. In summer 2021, we evaluated our inventory protocol and made modifications to our sampling methodology, retaining the goals of efficiency and affordability. Our summer 2022 work included updating our protocols and conducting inventories at two 500YFF forests and producing reports. We also investigated methods for estimating carbon storage and sequestration rates for mid-latitude mixed deciduous hardwood forests, and options for collaborative landowner.

Luke Triplett '24, Duke University, Sampling techniques for neural network committor solvers

Advisor: Maria Cameron, University of Maryland

Deep neural networks have allowed us to find numerical solutions to Partial Differential Equations (PDEs), which were previously impossible to estimate within a reasonable computational budget. One recent application is the study of rare events in chemical physics, where chemical reactions, molecule realignment, and switching between oscillation modes can all be modeled as PDEs. For these systems, transitions occur on a much longer time scale than the random fluctuations within the system, making Monte Carlo sampling techniques ineffective and motivating the use of neural networks. A mathematical framework called Transition Path theory has been developed to study rare transitions. The critical function in transition path theory is the committor, which gives the probability that a trajectory from a particular point will reach one state before the other. Mathematically, the committor can be expressed as the solution to the PDE given by the backward Kolmogorov equation. An accurate approximation of the committor is necessary to get reliable statistics for the transition rate and identify common transition mechanisms. I explore different neural network architectures and sampling techniques that will provide reliable committor approximations.

Emily Schloss '23, Bridgewater College, Metabolic rate-dependent shifts in the rate of regeneration and body growth in axolotls

Advisor: Moshe Khurgel

Axolotls are indeterminate growers and demonstrate robust post-traumatic regeneration of many organs. Body growth and organ regeneration rely on substantial cell proliferation and require metabolic resources beyond routine homeostasis maintenance. We measured axolotls' rate of metabolism, as well as rate of growth and rate of limb regeneration under different environmental temperatures. Adult animals (4-5 yrs. old) were maintained on the same diet, while housed at 10 OC, 15 OC or 20 OC. Oxygen utilization in respiratory chambers, limb regeneration, body mass, and animal length were measured periodically prior to and following unilateral limb amputations. Metabolic rate (extrapolated from oxygen use) was highest at 20 OC and declined proportionately in animals housed at lower temperatures. Limb regeneration proceeded robustly at 20 OC, albeit slower than in age-based controls (1 yr. old). Limb regeneration was slower at 15 OC and slowest in animals at 10 OC. Paradoxically, body growth was significantly higher in animals that were housed at colder temperatures. These results suggest the existence of metabolic controls in axolotls that shuttle resources between regeneration and body growth, depending on the interplay between environmental temperature and metabolic rate.

1. Brooke Morris '23, Virginia Wesleyan University, Distributed pharmaceutical analysis laboratories method validation for Ceftriaxone

Advisor: Maury Howard

The manufacture and distribution of fraudulent medicines is a pressing issue that can have a range of consequences. Substandard and falsified drugs fail to treat illness, contribute to microbial resistance to antibiotics, and can be toxic or deadly. The World Health Organization has identified this issue as a threat targeted at low and middle-income countries, as they typically have the direst need for pharmaceuticals. In the interest of analyzing pharmaceuticals for falsities, distributed pharmaceutical analysis laboratories (DPAL) were established as a resource for the WHO to evaluate pharmaceuticals purchased from low and middle-income countries. DPAL project laboratories must employ a specific set of validation methods to ensure their results are accurate. As participants of the DPAL project we are evaluating ceftriaxone collected from Kenya for possible deficient or fraudulent samples.

2. Ian Moran '24, James Madison University, Building better wind turbines for a sustainable world

Advisors: Philip Frana, Matthew Chamberlin

Wind energy is a leading form of sustainable energy production and has seen immense development and growth in recent years. Since the original massive turbine structures have come smaller, more efficient, and more effective designs for converting wind into power. How can we utilize wind energy to its maximum potential? This project investigates some different methods of producing energy from the wind through various design and structural features, as well as offering suggestions for future installments using the different methods exemplified. Harnessing wind for energy efficiently is crucial for a sustainable world and can greatly help decrease carbon emissions.

3. Annabelle M. Palmer '23, Virginia Tech, Fabrication and characterization of perfluorinated sulfonic-acid (PFSA) ionomer membranes

Advisor: Erin R. Crater

Alternative energy sources to fossil fuels are currently being explored to address the global energy crisis and the impacts of fossil fuels on climate change. Hydrogen fuel cells are an attractive option due to the inert byproducts (water and heat). Perfluorinated sulfonic-acid (PFSA) membranes are a class of ionomers commonly used in hydrogen fuel cells as proton exchange membranes. The physical properties of PFSAs give each commercial variety unique, known properties such as proton conductivity, water uptake, mechanical relaxation temperature, and degree of crystallinity. This study investigated the measured change in the mechanical properties of PFSAs with different identities, i.e., equivalent weights and side chain lengths. Dynamical mechanical analysis was used to measure the change in storage and loss moduli to find the alpha relaxation temperature of the membranes. Structure-property relationships were established between the different chemical structures and the mechanical properties.

4. Emily Pappalardo '23, Aimee Buchanan '24, Christopher Newport University, The Fading Affect Bias and the 2020 election's relation across election and non-election events online

Advisor: Jeffrey Gibbons

The Fading Affect Bias (FAB; Walker et al., 2003a) is the tendency for negative affect to fade faster than positive affect (e.g., Walker et al., 1997). The FAB is negatively related to psychological distress (Gibbons & Lee, 2019) and other unhealthy measures, which has led researchers to view the FAB as a healthy coping outcome/mechanism (Walker et al., 2003b). As past political research showed that losing voters reported unpleasant emotions toward elections and winning voters reported pleasant emotions (Anderson, 2005; Cigler & Getter, 1977; Singh, 2014), Gibbons et al. (2020) expected and found that losing voters (liberals) experienced a lower FAB than winning voters (conservatives) in the 2016 presidential election. We extended the procedure from the Gibbons et al. study to the 2020 presidential election online using Amazon Mechanical Turk (MTurk) and Qualtrics. Participants were monetarily compensated for completing personality questionnaires and providing original and current affect ratings for unpleasant and pleasant election and non-election events. We have collected data from 197 participants (goal is 240). We expect a robust FAB that is smaller for political events than for non-political events, as well as other complex 3-way interactions. We also expect rehearsal ratings to mediate all 3-way interactions.

5. Gabriel Mendelson '23, Virginia Tech, Enzyme mutations that affect branched-chain amino acid synthesis in Arabidopsis

Advisor: Guillaume Pilot

Proteinogenic amino acids are organic compounds that constitute protein structure, and are vital for developmental and metabolic functions. Essential amino acids (EAAs) are a group of nine proteinogenic amino acids that monogastric animals cannot synthesize. Only plants, bacteria, and archaea can de novo synthesize EAAs. The EAAs Valine, Leucine, and Isoleucine are classified as branched-chain amino acids (BCAAs). Acetohydroxyacid Synthase (AHAS) is the first enzyme within the conserved BCAA synthesis pathway, which is inhibited upon binding of amino acids with its regulatory subunit (RSU), preventing over-synthesis of BCAAs. The AHASS2 gene encodes one of the two the RSUs, in Arabidopsis thaliana. Four Mutations in AHASS2 might reduce the feedback inhibition of AHAS by BCAAs, enabling the mutant plants to exhibit higher resistance to Val. For this hypothesis, I measured AHAS activity of mutant and wild-type plant extracts in the presence of BCAAs. Because AHAS is difficult to isolate for enzymatic assay measurement, I first optimized the extraction protocol to increase enzyme stability. Understanding the molecular regulation mechanism of AHAS activity would enable us to engineer more nutritious plant containing more BCAAs in their seeds and organs. This allows cost-effective and increased supplementation of BCAAs within commercial crops and livestock feed.

6. Hannah Peacock '22, Lorelee Hoffer '23, Nicole Lydic '23, Noah Prinzbach '23, Virginia Tech, Prompting interpersonal gratitude at pedestrian crosswalks: Demonstrating functional control of a practical intervention

Advisor: E. Scott Geller

American society seems to be more individualistic and self-serving than collectivistic and interdependent. Positive psychology research has shown that expressing interpersonal gratitude increases subjective well-being (SWB) in both the benefactor and the beneficiary. This field study was designed to increase pedestrian-to-driver waves of gratitude at marked crosswalks on the Virginia Tech campus. An ABA-reversal and multiple-baseline designs were employed to evaluate whether the Intervention—a large sign placed prominently at the crosswalk with the message, “Please Thank Drivers with a Wave”—would increase waves of gratitude. Undergraduate research students sat unobtrusively next to targeted crosswalks and observed pedestrians on the crosswalk and recorded if they waved to the driver who was stopped. Each research design demonstrated functional control of the prompting intervention. The overall mean percentage of waves during the observation sessions was 8.6% of 15,124 pedestrians during Baseline, 10.3% of 25,993 pedestrians during Intervention, and 6.1% of 60,764 pedestrians during the second Baseline. Although the percentage of pedestrians waving a gesture of gratitude was disappointingly low throughout, the intervention was effective and showed that a reminder to express gratitude can increase this desirable behavior and in turn, add positivity to the lives of individuals.

7. Kailynne Landry '25, Micaela Flores-Vaccari '24, Christopher Newport University, Testing preference for higher- vs lower-fidelity social stimuli in zebrafish (*Danio rerio*)

Advisor: Andrew Velkey

Zebrafish (*Danio rerio*) are useful for studying the mechanistic and functional bases of social behavior. The current study examines social choice behavior in zebrafish with the goal of determining if zebrafish show preference for a higher-fidelity live stimulus over a lower-fidelity mirror on a discrete-choice instrumental-response. Subjects (N = 24) were housed in a submerged T-maze and provided thrice-daily opportunities to choose between a visual interaction with a live conspecific (the high-fidelity stimulus) or a mirror presentation (the lower-fidelity stimulus). Upon selection, each social reward was presented for 30 seconds. Trials were repeated 3 times a day for 5 days a week. After the first 15 trials, subjects' preferences were considered stabilized when they selected the same alternative on 8 out of 10 of the most-recent trials. Current results reveal a roughly equal number of subjects stabilizing on the higher-fidelity live stimulus, the lower-fidelity mirror stimulus, or with no demonstrated preference. Because this research is in its initial stages, future trials may uncover a more definitive preference for one type of social stimulus. However, additional research could also reveal that there are several behavioral phenotypes of wild-type zebrafish, some of which demonstrate social preference and some that do not.

8. Connor Kreitzman '24, James Madison University, Using music to elicit fear in horror movies

Advisors: Philip Frana, Matthew Chamberlin

The defining characteristic of all horror movies is their fear factor. The sound and music in horror films is incredibly distinctive and not found in any other genre of film and they are instrumental in increasing the fear factor of the audience. This poster explores the role that sound has in horror films along with characteristic tropes and techniques that are used when making effective horror movie music and sounds. Infra sound, otherwise known as low status sound, is an example of a technique used in specifically horror movies to elicit fear.

9. Marcela Izquierdo Poza '24, Randolph College, Investigating navigation using smartphone sensors

Advisor: Peter Sheldon

Inertial navigation has long been used for measurement of acceleration, speed, position and orientation in commercial travel (boats, planes), but the systems are complicated and expensive. These systems are comprised of devices called accelerometers and gyroscopes that may be enhanced by magnetometers and altimeters. More commonly known for navigation, GPS is good for two-dimensional positioning on a surface, but not for orientation or altitude, and GPS signals are not always available since they require communication with satellites. Inertial navigation systems are self-contained and do not require communication with an outside agent. We have studied using affordable accelerometers and gyroscopes built into smartphones for inertial navigation in a long-term project on rollercoasters, and more recently as a replacement for standard introductory physics-lab equipment. We recently found an exciting anomaly in the iPhone accelerometer that is not mentioned in the literature, which we studied in detail.

10. Leila Pruscino '23, Virginia Tech, Connected or disconnected? How students' screen time affect their perceived social support

Advisor: E. Scott Geller

People are innately social beings, constantly seeking connection so it is not surprising that people utilize cell phones to stay in frequent contact with others. This study aims to examine whether increased cell phone usage has a negative impact on perceived social support. Perceived social support refers to the extent to which people feel emotionally supported by their friends, family, and loved ones. Virginia Tech undergraduate students completed a survey that consisted of three major components, the first involved questions from the Multidimensional Scale of Perceived Social Support (Zimet, et al., 1988) to assess the perceived level of social support. The second component consisted of questions from the Big Five Personality questionnaire to identify an individual's level of extraversion and neuroticism. The third component asks students to report statistics on their device's screen time and social media application usage. It is hypothesized that individuals with higher screen times will have less perceived social support, and will score lower on extraversion and higher on neuroticism. These results could provide a connection between certain personality traits and cell phone usage, and reveal informative correlations between cell phone use and perceived social connectedness.

11. Gabriela Rocha '23, Zachary Alam '24, Christopher Newport University, *The Fading Affect Bias was larger for non-alcohol events than for alcohol events*

Advisor: Jeffrey Gibbons

The Fading Affect Bias (FAB) is the faster fading of unpleasant emotions than pleasant emotions (Walker et al., 2003; Walker et al., 1997). The current study instructed participants to describe eight different events and provide their affect ratings and rehearsal ratings for each event in an online survey through Amazon Turk. Participants described four alcohol-related events and four non-alcohol related events, with half of each of those events being pleasant and unpleasant. Participants were also asked to provide their original emotion of the event and their current emotion of the event. We found a robust FAB effect ($F(1, 953) = 214.630, p < .001$). Additionally, the FAB was larger for non-alcohol events than for alcohol events ($F(1, 953) = 5.857, p = .016$), which supported the notion that the FAB is a healthy coping mechanism. The FAB was positively predicted by healthy variables (e.g., positive PANAS, GRIT) and negatively predicted by unhealthy variables (e.g., negative PANAS, anxiety). The 3-way interaction did not approach significance, which may have been due to the low number of participants. After analyzing all 240 participants, we expect this three-way interaction to reach significance.

12. Parker Bigley '24, James Madison University, *Understanding intergenerational communication in the context of neurodivergence and mental health*

Advisors: Philip Frana, Matthew Chamberlin

Our neural diversity is one of our unique attributes as human beings. Neural diversity allows us to create all sorts of different frameworks of knowledge, creativity, and perspective. Why is it, though, that we have created societal structures that are so intolerant of differences? How did we (and do we) decide which aspects of our humanity are “acceptable” and which are “disordered”? How do these varied perspectives affect our psychological states and communication styles? I will explore answers to these questions, particularly in the context of intergenerational neurodivergence and mental health. It is vital that we begin understanding and appreciating our differences, because they truly are our humanity.

13. Erin Schriever '23, Randolph College, *Accuracy of an iPhone 12's accelerometer when measuring acceleration down an incline*

Advisor: Peter Sheldon

Smartphones are ubiquitous, even for most low-income students [1]. Smartphones contain sensors that can provide tools for making scientific measurements, and they are accessible. In this experiment, we are exploring an anomaly previously seen by us, but not confirmed in the literature: an iPhone12 and a PASCO Scientific Accelerometer were attached to a cart and sent down an incline to compare measurements of acceleration. The data from the two devices was compared and a discrepancy was found. On a lower-angle incline, we see the acceleration of the iPhone12 decaying (not remaining constant as expected) as it went down the incline. This result may indicate that an iPhone12 is not effective at measuring constant accelerations, which is a common type of motion studied in introductory physics, and which is required in order to be able to use a phone for inertial navigation (our final goal). Further experiments need to be done. [1] M. Anderson, J. Jiang, et al., “Teens, social media & technology 2018”, Pew Research Center 31, 1673-1689 (2018).

14. Matthew Traversa '23, Sheena Kron '23, Gabriela Rocha '23, Christopher Newport University, *Do marijuana event false alarms predict the Fading Affect Bias in a diary study?*

Advisor: Jeffrey Gibbons

The tendency for unpleasant emotions to fade faster than pleasant emotions is known as the Fading Affect Bias (FAB; Walker et al., 1997). The FAB is a healthy coping mechanism that improves with life satisfaction (e.g., Walker et al., 2003) and self-esteem (Gibbons et al., 2017) and it decreases with depression, anxiety, and stress (Gibbons & Lee, 2019). Based on the positive relation between FAB and alcohol consumption found by Gibbons et al. (2013) for alcohol events, the FAB may not always be a healthy coping mechanism. Although Pillersdorf and Scoboria (2019) found a negative relation between the FAB and marijuana consumption for regular events, we wanted to examine if that relation would change for marijuana events. Specifically, we evaluated online the relation of the FAB to healthy and unhealthy variables, including marijuana consumption, across marijuana and non-marijuana events. For non-marijuana events, we replicated the negative relation of FAB and marijuana consumption found by Pillersdorf and Scoboria, but we found a positive relation between FAB and marijuana consumption for marijuana events. Rehearsals mediated these findings. Although the FAB is a healthy coping mechanism in most situations, it becomes an unhealthy coping mechanism when individuals reflect upon alcohol- and marijuana-related events.

15. Roman Trettel IV '23, Hampden-Sydney College, *Regional survey of aquatic macroinvertebrate biodiversity in Buffalo Creek and its tributaries*

Advisor: Scott Starr

The Buffalo Creek Watershed is a tributary branch to the Appomattox River situated in the western region of Prince Edward County, Virginia. This system covers around 300 square kilometers of Prince Edward County's 917 square kilometers and flows through a mosaic landscape of land usages. The headwaters are in mostly rural regions though the system's terminal point flows through the town of Farmville, VA. Eight field sites across the Buffalo Creek Watershed were sampled for aquatic macroinvertebrates. The sampling period occurred on June 30th and July 1st and yielded a total of 267 aquatic macroinvertebrates from nine orders and 24 families. Water samples were also collected at each site for a general snapshot of the each stream's quality. The water samples were as expected for this region while MAIS (Macroinvertebrate Aggregated Index for Streams) scores for the sites were rather low with only one site scoring Good, three sites scoring Poor/Fair, and four sites scoring Very Poor. Almost every site was dominated by the five most abundant families in the sample, however the scores may be skewed due to small sample sizes collected throughout the study rather than being a representative of pollution in the watershed.

16. John Tucker '24, Olivier Kenol '24, Christopher Newport University, *Effect of source and priming on the recognition and believability of media headlines*

Advisor: Jeffrey Gibbons

Unbelievable media headlines are perceived as more believable over extended periods, and recognized with greater accuracy than more plausible headlines (Gibbons et al., 2005). Furthermore, headlines with a source headline at learning were recognized more accurately if they were sourced than non-sourced at test. This matching across learning and test is referred to as encoding specificity (Santa & Lamwers, 1974). The study examined whether media primes and matching/mismatching sourcing across learning and test would affect the recognition and believability of believable and unbelievable headlines. After providing consent, demographic information, and media consumption, participants saw one of three media primes: New York Times, Twitter, match problems (control). At learning, the participants will be presented with 12 believable and 12 unbelievable headlines, either being consistently or inconsistently sourced across time. Participants will then rate the believability of the headlines on a scale ranging from -3 (extremely unbelievable) to 3 (extremely believable). The participants will return after 48 hours, they will rate the believability of 48 headlines (12 believable and unbelievable foils as well as 12 believable and unbelievable targets from learning). We hypothesize that the strongest recognition and believability will occur for headlines that are sourced at both times of the study.

17. Timothy Custer '24, James Madison University, *The 'influencer' era: Demystifying the marketing, monetization, and search engine optimization of social media platforms*

Advisors: Philip Frana and Matthew Chamberlin

Social media has become ubiquitous and nearly inescapable in our daily lives. It has revolutionized how people communicate, interact, and spend their time. Marketers have noticed this, and want to take advantage of the time people spend on their phones. Although a relatively new development, social media marketing has quickly risen in popularity in business and commerce. Marketers and companies no longer need to compete against other products and brands. Instead, we live in an age where marketers are competing only for consumer attention. This poster will explore the rise in popularity of social media, the "influencer" era, digital and social media marketing techniques, and the monetization, SEO, and analytics of contemporary social media marketing.

18. Claudia Hilton '23, Julia Coron '22, Isabel Motil '24, Bianca Mellard '23, Virginia Tech, *Systematic observations of interpersonal gratitude on campus buses: Modeling vs. diffusion of responsibility*

Advisor: E. Scott Geller

This field research is comparing the differential influence of two notable psychological theories - observational learning and diffusion of responsibility. Observational learning predicts people will take cues from the actions of others and model relevant behavior. On the other hand, diffusion of responsibility predicts that people will be less likely to take responsibility for the welfare or wellbeing of another person if others are available to actively care. This field study observed expressions of interpersonal gratitude on campus buses, as a function of other passengers expressing similar gratitude. Specifically, undergraduate researchers have been recording whether passengers thank bus drivers as they disembark, and whether a "Thank you" is influenced by the drivers exhibiting prosocial behavior (e.g., saying "Have a nice day!"). Analysis is ongoing and focused on whether passengers exhibit observational learning or diffusion of responsibility more often. Our observations have indicated that prosocial behavior exhibited by the driver increased expressions of gratitude from exiting passengers. While 71.4% of passengers followed a driver's kind remarks with a "Thank You," those passengers exiting after this passenger were less likely to express gratitude, supporting diffusion of responsibility over modeling or observational learning. Observations are ongoing and additional findings will be reported.

Poster Session II Hampson Commons 2:45-3:45 p.m.

19. David C. Banks '24, Hampden-Sydney College, *Electrospinning plant-based proteins for skeletal muscle tissue scaffold*

Advisor: Kristin Fischer

Regenerative medicine is a promising field that allows the ability to replace and treat tissue and/or organ damage. Natural materials like plant-derived proteins have become popular for creating electrospun scaffolds. Zein, a protein from maize, was electrospun in this study to create a scaffold for skeletal muscle tissue. Ten solutions composed of either 30%, 40%, or 50% zein (w/v) and made with: glacial acetic acid (gAcOH), trifluoroethanol (TFE), dichloromethane (DCM), and/or dimethylformamide (DMF) were electrospun. During electrospinning, many solutions had problems with excessive drying of the zein solution on the needle tip, polymer clumps on the scaffold, occasional film formation, and electrospinning. Changes were made regarding the solvent type, the amount used, and/or the electrospinning parameters to resolve many of these issues. One solution, 40% zein in a 2:1:2 of TFE:DCM:DMF, was able to create a suitable scaffold for skeletal muscle tissue because it contained fibers that were aligned.

20. Kaylee Botset '23, Lauren Meier '23, Kaitlyn Westerhold '23, TJ Shaw, graduate student, Virginia Tech, *The indirect effects of emotion dysregulation in the association between attachment and physical IPV perpetration (WITHDRAWN)*

Advisor: Meagan J. Brem

Annually, an alarming 29.4% of college students perpetrate physical intimate partner violence (IPV; e.g., slapping, hitting, choking a partner; Elmquist et al., 2014) underscoring the need for prevention programs. Evidence from recent studies suggests that adults with anxious or avoidant attachment orientations (insecure attachment) may contribute to IPV perpetration (Sommer et al., 2016; Arriaga et al., 2017). Specifically, insecure attachment may contribute to emotion dysregulation (Brem et al., 2021; Hoover & Jackson, 2019; Watkins et al., 2016). We hypothesized that insecure adulthood attachment would indirectly relate to IPV perpetration through emotion dysregulation. College students (N = 211, 73.8% women) completed the Experiences in Close Relationship Scale-Short Form (Wei et al., 2007), Difficulties in Emotional Regulation Scale (Gratz & Roemer, 2004), and the Revised Conflict Tactics Scale (Straus et al., 1993) as self-report measures. We used Hayes' PROCESS macro for SPSS to test the indirect effects of anxious and avoidant attachment on IPV through all six emotion dysregulation facets (Hayes, 2022). Overall, both anxious, $F(7,203) = 2.11, p = .04$, and avoidant, $F(7, 203) = 2.26, p = .03$, models were significant, and were indirectly related to IPV through impulsivity only ($B = .05, p < .001$).

21 Sarah Brantley '24, James Madison University, *Fostering long-lasting relationships between businesses and nonprofits*

Advisors: Philip Frana, Matthew Chamberlin

Nonprofit organizations help our communities by providing individuals with goods and services they may not be able to provide themselves. They bring societal issues to light and are at the forefront in implementing policies that drastically improve life for everyone. How do we establish, sustain, and further expand profit-based organizations in the United States? How can business and nonprofit organizations build up symbiotic relationships? Businesses have the marketing expertise to promote nonprofits to larger audiences. In return, these companies improve their own visibility in competitive markets, while also bringing awareness to and advocating for the issues that have an impact on their bottom lines.

22. Henry Carman '23, Hampden-Sydney College, *A survey of ranavirus prevalence in two freshwater turtle species in central Virginia ponds,*

Advisor: Rachel Goodman

Ranaviruses are emerging infectious diseases that infect ectothermic vertebrates. Studies have documented ranaviruses causing die-off events in amphibians, turtles, and fish, but research on the impacts of this pathogen in asymptomatic turtle populations is limited. We captured two species, *Chrysemys picta picta* (Eastern Painted Turtles) and *Sternotherus odoratus* (Common Musk Turtles), in two water bodies on the campus of Hampden-Sydney College in central Virginia. We captured 198 individuals between the summers of 2021 and 2022 with 43 recaptures. We took 241 skin samples to test for the presence of ranavirus DNA using quantitative polymerase chain reaction (qPCR). Ranavirus was prevalent in turtle populations at our sites in 2010 with *C. p. picta* testing 31.6% and 17.4% positive (Goodman et. al 2012), but our recent sampling indicates that the virus has decreased to near undetectable levels in our population. We do not have a definitive reason for the decrease in prevalence from 2010 to 2021-2022.

23. Lauren Chadwick '22, Matthew Traversa '23, Krystal Langhorne '25, Olivier Kenol '24, Brenna McManus '26, Spencer Close '22, Christopher Newport University, *Do lure words and word recall predict the Fading Affect Bias?*

Advisor: Jeffrey Gibbons

The Fading Affect Bias is the psychological construct wherein negative emotions fade faster than positive emotions (FAB; Walker et al. 1997). A diary study by Dayton et al. (2019) found that participants who recalled many contrived events also showed low FAB. The current study's objective was to affirm the findings from Dayton et al. utilizing the Deese-Roediger-McDermott (DRM) procedure, which consists of 10 lists of 15 recorded words. After hearing each list, participants write down as many words as they remember. A "critical lure word" was not stated in the list, but it was, instead, a semantically connecting theme. For example, if the critical lure word was "cold," the list would consist of "ice, snow, temperature." The sample contained 184 CNU undergraduate students. We predicted a negative correlation between FAB and incorrectly recalled words. Additionally, we hypothesized that rehearsals would positively predict the FAB. Conversely, we found a strong positive correlation between the ratio of incorrect words to correct recalls and the FAB. Furthermore, a negative relation was found between rehearsals and the FAB. We discuss these surprising findings and suggest that future iterations of the study should include a visual element alongside the DRM procedure.

24. Jacqueline Clardy-Josephs '23, Randolph College, *Walk the plank: Virtual risk-taking and cheating in adolescents*

Advisors: Elizabeth Gross, Holly Tatum

In an embodied framework of psychology, the field has investigated the extent to which abstract cognitive concepts, such as morality, have been influenced by physiological factors, such as disgust and loss aversion. Theories of morality suggest that morality is strongly influenced by the loss or protection of resources. This finding suggests that risk-taking, which signals a potential loss of resources, should result in stronger judgments of morality, and vice versa. If disgust sensitivity is also perceived as a potential loss of resources – disgust is an emotion that signals potential bodily harm – then disgust sensitivity will also correlate with risk taking and morality judgments.

25. Liliya Petrosyan '24, James Madison University, *Towards a sociological understanding of classical music institutions*

Advisors: Philip Frana, Matthew Chamberlin

Music is undoubtedly a key component of our culture; it is deeply intertwined with our cultural practices and identities. Increasing attention is devoted to the study of music as a culture in and of itself. This poster provides an overview of the prevailing theories of cultural reproduction and consumption while applying them to classical music. What hierarchies and stratifications are present in classical music? How are they reinforced? How do stylistic and social developments align with or upset these hierarchies? Particular attention is paid to the sociology of music in a post-secondary context, as well as the cultures produced at such institutions.

26. Mengna Zhao '23, Randolph College, *Orientalism in Hollywood films made by Asian/Asian-American filmmakers*

Advisor: Jennifer Gauthier

This project is rooted in a cultural studies approach to cinema, in which film is studied in relation to cultural values and meanings. Our research examined the films of Asian and Asian-American filmmakers working in the American film industry. We conducted textual and content analysis to find patterns in the themes and style of their films. We also researched the historical, political and social context of these films to better understand why they were successful or unsuccessful with audiences and critics. Examining shifts in American values can offer insight into why certain films are popular at certain times. The research paid specific attention to representations of gender, the role of stereotypes and how the films address their audience.

27. Katie Dealey '24, James Madison University, *Art therapy for rehabilitation in juvenile detention centers*

Advisors: Philip Frana, Matthew Chamberlin

Though it is a relatively new way of approaching rehabilitation of body and spirit, art therapy has grown in popularity and been integrated into a range of successful programs. One of the most notable examples is juvenile detention centers. How effective have these programs been in the past? What about art therapy is so impactful in the lives of the inmates? Is there any potentially harmful outcomes of these programs? This poster explores these questions and will shed light on the incredible possibilities that these programs open up. In the endless quest towards a better and brighter world, it is vital that we learn as much as we can about all the different forms of healing.

28. Sonia Warrior, '23, Muskaan Gupta '23, Lorelee Hoffer '23, Chloe Kucharczk '23, Virginia Tech, *Situational determinants of interpersonal expressions of gratitude: Behavioral observations on the Virginia Tech campus*

Advisor: E. Scott Geller

Psychological science has shown that interpersonal gratitude can increase subjective well-being and happiness among those who express gratitude regularly. This project observed the frequency of prompted versus unprompted expressions of gratitude among students entering and leaving a campus exercise facility. A total of 493 participants were observed entering and exiting this facility. The observer recorded whether the receptionist gave a friendly prompt like "Have a good workout" to those entering the facility, or said something like "Have a nice day" when an attendee was leaving the facility. When entering the facility, the percentage of attendees who expressed gratitude following the receptionist's prompt was 67.6% of 145 individuals, but was only 21.9% of 146 individuals when the receptionist did not offer a prosocial prompt to the attendee. When leaving the facility, 77.5% of 111 persons voiced gratitude when the receptionist gave a positive prompt, but only 34.1% 91 individuals expressed a "Thank you" when the receptionist did not offer a positive prompt first. Additional factors were observed and recorded for follow-up analyses, including the gender of the receptionist, the time of day, and whether the attendee was accompanied by someone.

29. Pierce Gemborys '25, Hampden-Sydney College, *Implementation of CW-EPR, a Python package for analyzing and processing EPR spectra*

Advisor: Herbert J. Sipe, Jr.

The need for reproducibility at the heart of science led to the necessity of a modular user interface with the advent of computer-based data processing and analysis. Dr. Bill Tiskup and Dr. Mirjam Schroder designed CW-EPR, a Python program that allows for reproducing EPR spectra with little to no coding skills. The H-SC chemistry department desired to use this program for analyzing and processing raw EPR data in a classroom setting. The program needs to read specific files used by the chemistry department, including DAT and LMB files.

30. Emily Peterson '22, Zachary Alam '24, Aimee Buchanan '24, Lauren Chadwick '22, Olivier Kenol '24, Krystal Langhorne '25, Gabriela Rocha '23, Matthew Traversa '23, John Tucker '24, Sevrin Vandevender '25, Christopher Newport University, *Problem solving attitudes and emotional regulation as represented by the Fading Affect Bias*

Advisor: Jeffrey Gibbons

The Fading Affect Bias (FAB; Walker et al., 2003) is an emotional regulation phenomenon that describes the tendency for unpleasant emotions to fade faster than pleasant ones (Walker et al., 1997). Based on the research showing an association between emotional regulation and problem solving ability (Spering et al., 2005), the current study examined the relation between problem solving assessments and the FAB across problem-solving and non-problem-solving events. First, participants filled out several general demographic questions examining their affect levels and problem solving abilities. Participants then recalled and described two pleasant and unpleasant problem solving and non-problem solving events by rating their previous and current emotions and rehearsal frequency. Problem solving ability and emotional intelligence were predicted and found to be positively related to the FAB. Furthermore, the positive relation between emotional regulation and the FAB was larger for problem solving events than for non-problem solving events, which extended past FAB research as well as research on problem solving and emotional regulation.

31. Lorelee Hoffer '23, Lizzy Geddes '25, Anastasia Semenova '25, Ella Vozzo '25, Virginia Tech, Effects of interpersonal kindness from students to professors on mood status for both parties,

Advisor: E. Scott Geller

This study evaluated the impact of gratitude expressions on the mood states of students, using a customized thank-you card (TYC) delivered to a professor after their class. Two students in a university class were the TYC benefactors—a research student and another unaffiliated student in the same class. Both students completed a mood survey before class, and then after class—once the students gave their TYC's to the professor—they completed the survey again. The survey used a semantic differential with 15 pairs of contrasting mood states (e.g., sad vs. happy) and a rating scale with “1” at the extreme negative end and “10” at the extreme positive end. The card itself included a space for the benefactors to write their experience delivering the card, as well as the reactions of the beneficiary (i.e., the professor). A qualitative analysis of these comments evidenced uniformly positive emotions from not only the professors, but also from all 64 participants after having delivered the TYC. A quantitative analysis of the survey data concluded that the students' overall positive mood states increased significantly by an average of 36% after delivering a TYC to a professor, demonstrating the beneficial impact of expressing interpersonal gratitude.

32. Sarah McCormick '24, James Madison University, Protecting and nurturing society through informed crime prevention

Advisors: Philip Frana, Matthew Chamberlin

Crime is a vast subject that has always been at the center of media, culture, and the public mind. What drives human beings to commit horrific acts against their fellow man, and how can we as a society prevent this from occurring? What do we do when the systems to protect us work against the most vulnerable in our communities? How can we ensure the protection and safety of those we love and care about while living in an ethical society with fair and equal treatment? The debate over whether nature or nurture determines if one will engage in criminal activity is a lengthy, strenuous debate between scholars and advocates alike. In order to best cultivate our society, we must enact programs that directly support and benefit at-risk groups through positive policy change and government programming.

33. Tyler Parker-Rollins '24, Rowan Lacey '24, Evan Alvarez '24, Lana Nazzal '22, Karina Daniel '24, Virginia Tech, Practical interventions to increase the use of reusable bags for groceries on a large-scale

Advisor: E. Scott Geller

Without large-scale behavior change, the annual flow of plastic into the ocean will triple over the next 20 years, limiting climate regulation of the ocean and severely harm ecology. Unfortunately, most grocery-store customers choose single-use plastic bags over reusable bags. The present study evaluated the impact of a prompting and feedback intervention designed to increase the use of reusable bags at two large grocery stores. Baseline observations from January to March 2022 indicated that less than 14% of 2,664 observed customers used reusable bags. From April to May, we implemented a prompting/feedback intervention by placing large posters at the exit of two grocery stores, with the phrase “Hokies, Choose to Reuse!” and the percentage of customers using reusable bags the prior week. Because this intervention did not influence a significant change in behavior (12% of 1,725 customers used reusable bags during the intervention), we will implement an innovative intervention in Fall 2022, after repeating Baseline observations. The intervention will use group identity and intergroup competition to promote the use of reusable bags. This intervention will be alternated at the two grocery stores in a multiple baseline design, in order to show whether this intervention increases the use of reusable bags.

34. Taylor McGee '23, Hampden-Sydney College, Electron spin resonance spectroscopic characterization of the Phenoxy radicals from Thymol & Carvacrol

Advisor: Herbert J. Sipe, Jr.

Thymol is a molecule found in common Thyme, which has been shown to have strong anti-microbial and bacterio-static properties as well as anti-tumor properties. Previous studies have demonstrated that radicals can be generated and characterized using techniques that cannot take place in a biological system. Carvacrol is a constitutional isomer to Thymol where the hydroxyl group is moved to be next to the methyl group. Research has indicated that even micromolar doses of carvacrol can have statistically significant effects on the progression of even aggressive cancer cell lines. One of the theories concerning the mechanism of Thymol's and Carvacrol's anti-tumor and anti-microbial properties is that the molecular hydroxyl forms radical species. These radicals can generate a state of oxidative stress that can selectively trigger an immunological cell death in cells. Due to the molecular activity at such low concentrations, electron spin resonance spectroscopy was used to characterize the radical species generated from the breakdown of the two molecules. The molecules have been successfully characterized by ESR spectroscopy and the interpretation of said molecules is included here within.

35. Emma Saville '24, James Madison University, Navigating the difference between appreciation for and appropriation of cultures

Advisors: Philip Frana, Matt Chamberlin

Everyone has seen some form of appropriation in their life: someone wearing a Native headdress to a festival, celebrities wearing cornrows or box braids in their hair, and many more. Appropriation is when something that is culturally significant is taken and used by someone not of that culture or race. What makes it appropriation is the act of taking it without permission nor reference to the culture, and it often perpetuates harmful stereotypes. While appropriation is wrong and should be avoided there are ways to pay respect and appreciate of the culture cannot appreciate and partake in it. This poster explores the differences in appreciation and appropriation, what each looks like, and how to navigate other cultures in a respectful manner.

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