

2017

Celebration 2017 Abstract Booklet and Student Presentation Schedule

Xavier University - Cincinnati

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Celebrate

A CELEBRATION OF STUDENT RESEARCH AND CREATIVE ACTIVITY

On behalf of the College of Arts and Sciences and the Office of Undergraduate Research, we'd like to welcome you to Celebration of Student Research and Creative Activity. This is a special year for the Celebration, as for the first time, it is being funded, nearly in full, by donations from students, friends and alumni of the University through the recently completed March Gladness Campaign. This successful fund-raising campaign, which saw undergraduate research receive the second largest number of donations, is a testament to the value of undergraduate research as a cornerstone of the Xavier experience.

Undergraduate research provides the opportunity for students to become practitioners of a discipline. In the classroom, students study history, chemistry and psychology; in research, they become historians, chemists and psychologists. Furthermore, undergraduate research allows strong bonds to form between students and faculty mentors. These relationships, forged in the research lab, the artist's studio or the library archives, are relationships that continue long after the research is complete and students have left the University to make their own mark on the world.

The abstracts showcased herein represent the work of over 140 students, working with over 40 faculty mentors from numerous departments and all three colleges.

To the student presenters: Be proud of the work you have done and enjoy the celebration you so richly deserve. We hope you found the research experience meaningful, engaging and transformative.

To the faculty mentors: Without the support of caring mentors, undergraduate research would not exist. Thank you for sharing your time and your passion and your interests with our students, sometimes sacrificing your own professional ambitions in support of theirs.

To the supporters of undergraduate research: Thank you for the support, financial and otherwise, that allows us to celebrate and recognize the work done over the past year, while continuing to make these opportunities available to all interested students.

And finally, to the student attendees: May you be inspired by the work of your fellow students such that one day you will take advantage of similar opportunities to more deeply engage with your chosen discipline.

Sincerely,

Dr. David Mengel



Dean, College of Arts and Sciences

Dr. Richard J. Mullins



Professor, Department of Chemistry
Director, Office of Undergraduate Research

Undergraduate Research Advisory Board

Dr. Christian End – Associate Professor, Psychology

Ms. Shari Howell, Grants Services

Dr. Russell Lacey – Associate Professor, Marketing

Dr. Justin Link – Associate Professor, Physics

Dr. Mack Mariani – Associate Professor, Political Science

Dr. Douglas Olberding- Associate Professor, Sports Studies

Keynote Speaker

Liz Hayden

Liz Hayden graduated from Xavier University in 2008 in the Philosophy, Politics, and the Public program. After working at Working in Neighborhoods, a Cincinnati community development corporation, for two years, she went to Ohio State University and received a Masters in City and Regional Planning and a Masters in Public Policy and Management. Liz has worked for the City of Hamilton's Economic Development Department for five years and focuses primarily on the efforts to revitalize downtown Hamilton. In this role, Liz has been recognized as a Developer Counsellors International 40 Under 40 recipient, Ohio Economic Development Association Rookie of the Year in 2014, and the Hamilton Vision Commission 2017 Work Award recipient. Liz is also a passionate advocate for women's issues and serves as Board Chair of the YWCA Hamilton, which serves Butler County.

Undergraduate Research Award Recipient

Drew Phillip

Drew Phillip is a senior Biology and Mathematics double major from Cincinnati, OH. At the end of his first year at Xavier, Drew began research with Dr. David Gerberry (Department of Mathematics) at the intersection of his math and biology majors. His work for several summers on aspects of biomathematics models culminated in a coauthored research publication this past summer. After graduating, Drew will attend the University of Cincinnati College of Medicine in pursuit of a career as a neurosurgeon.

Undergraduate Research Mentor of the Year (URMY)

Dr. Justin Link, Ph.D.

Dr. Link is a Musketeer at heart as he earned his B.S. in physics with a minor in mathematics from Xavier in 2002. He went on to earn his Ph.D. in physics at The Ohio State University with a focus on Biophysics. His research was at the intersection of physics, chemistry, and biology as he studied the most fundamental motions at the earliest timescales involved in protein conformational change.

Dr. Link's first year at Xavier was in 2008 and since then he has played a key role in the creation and administration of the Biophysics major while also providing a variety of research opportunities for students. His research interests continue to be highly interdisciplinary as he has been focusing on the conformational change and structural stability concerns when a mutation is made in protein systems. Together with his collaborators Dr. Dorothy Engle in Biology and Dr. Margaret Ahmad in Paris, France, they received \$250,000 in funds from the National Science Foundation to send four students to work in Paris each of the next three years.

During his eight years here at Xavier, Dr. Link has mentored over 28 undergraduate students, 15 of which have presented at regional and international conferences such as the March Meeting of the American Physical Society, Midwest Conference for Undergraduate Women in Physics, and the National Council on Undergraduate Research to name a few. Dr. Link truly believes that the best way to advance the scientific field is not necessarily through his publications but through the training and experiences that he can give to his students. They are the future of the yet unknown fields of science.

March Gladness Summer Research Fellows

Over the course of two days in March, 189 students, alumni, professors, staff members, and friends of the University came together to show their support for undergraduate research at Xavier through participation in the March Gladness fundraising campaign. Attracting the second largest number of donations on campus, undergraduate research received nearly \$10,000. These funds are going directly back to students through the funding of the Celebration of Student Research and Creative Activity, partial support of student travel to meetings, the funding of the first ever Xavier Undergraduate Research Award, and the support of two March Gladness Summer Research Fellows. The first recipients of March Gladness Summer Research Fellowships are Ihsan A. Walker and Emily Pausa.

Ihsan A. Walker, a graduate of St. Xavier High School in Cincinnati, OH, is a first year Biology major. He will work with Dr. Annie Ray of the Department of Biology. He was selected for this honor as a result of the great promise he shows as a scientist. Together, Ihsan and Dr. Ray will assess differences in species diversity and richness of native longhorned beetles in habitats invaded by the Asian longhorned beetle versus habitats that have not been invaded.

Emily Pausa, a resident of Trieste, Italy, is an International Studies Major. Besides excelling in her academic work at Xavier, Emily is a Tutor for the Department of Political Science and volunteers for Relay for Life. Her research proposal this summer on US-Irish Relations has already been accepted to be presented at the Annual Meeting of the Ohio Association of Economists and Political Scientists in September.

Castleberry Fellow Presentations

These presentations feature Castleberry Fellows from the Department of Management & Entrepreneurship who have had the opportunity to work directly with new business start-ups which are housed at Cincinnati's select business incubators and accelerators such as Cintrifuse, HCDC and Ocean Accelerator. During this experiential opportunity, students who are selected contribute to the success of a new start-up and learn--first-hand--the realities and opportunities associated with starting and running a new business.

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QUIETLY FEMINIST: THE CHANGING, BUT EVER-PRESENT ROLE OF CAPABLE WOMEN IN ALPHONSE MUCHA'S WORK

Trisha Brockmeyer (Dr. Suzanne Chouteau)

Department of Art

The purpose of this research is to draw together the connections between the quietly emerging feminism in France during the Belle Epoque Era of the turn of the twentieth century and the feminist tones in Alphonse Mucha's work. Through his presence in France and his partnership with Sarah Bernhardt, Mucha was exposed to a level of independence and societal involvement in women that he had not previously known, which translated to an often direct gaze and confident body language in the women he created for his posters and decorative panels. This regard for women carried on to his work outside of advertising, and women as indicators and symbols are repeatedly and prominently seen in his later work for Czechoslovakia, including the Slav Epic. This portrayal of women was aided by the influence of his esteemed wife and daughter which can be seen in his depictions of them. These undertones were a reflection of Mucha's time but also a premonition of the feminist movements and artworks to come in the 20th century. Through direct observation of the Alphonse Mucha retrospective exhibition at the Complesso del Vittoriano in Rome during the Summer of 2016, analysis of his personal and professional relationships with women, study of the burgeoning feminism of France, and deconstructing observation of expression and body language in his imagery, this research concludes that Mucha's lushly detailed and beautiful representations of women were primarily directed to the female gaze to inspire self-confidence and empowerment as their societal expectations shifted.

Athletic Training



PERSISTENT SHOULDER PAIN IN COLLEGIATE MALE SWIMMER

Alexandra Eggert (Dr. Lisa Jutte)

Department of Sport Studies

After swim practice, a junior, male, collegiate swimmer reported the return of his reoccurring right biceps pain and tightness, in addition to right upper trapezius pain. Upon evaluation, he reported point tenderness with palpation of his right biceps tendon and trapezius. He denied any numbness or tingling. The athletic trainer (AT) noted that active, passive, and resisted ROMs were WNL in all directions. His medical history included a posterior-superior labral tear of the right shoulder that was diagnosed by a shoulder MRI during his sophomore year. The patient underwent shoulder arthroscopy to repair the labrum followed by rehabilitation. At the beginning of his junior year, he was diagnosed with right bicep and rotator cuff tendonitis and paresthesia of the T1 dermatome. The patient completed seven weeks of strengthening exercises, which resolved his symptoms and allowed him to continue to swim. During his shoulder rehabilitation, the patient was also experiencing headaches that the team physician believed to be caused by muscle spasms. Due to the return of his right shoulder pain and medical history he was referred back to the team physician. Differential Diagnoses: Biceps tendonitis, nerve impairment, SLAP tear, upper trapezius spasm. Treatment: Upon evaluation, the team physician prescribed a Medrol dose pack, instructed the patient to swim as tolerated, and ordered a MRI of the cervical spine. The MRI revealed that the patient has Type I Chiari Malformation with multiple vermian cysts on the cerebellum. Chiari Malformation is characterized by the extension of the cerebellum into the foramen magnum; vermian cysts are fluid like sacs that appear where two hemispheres of the cerebellum connect. The team physician referred the patient to a neurosurgeon for possible treatment options; however the neurosurgeon did not recommend surgery at that time. The neurosurgeon cleared the patient to swim as tolerated. The team physician requested the patient be monitored and follow-up with the team physician in 6 months if the patient did not report new symptoms. The AT continues to treat this patient for headaches, and his right shoulder tightness and soreness until further treatment is recommended. The treatment includes bicep and pectoralis major stretching, Graston Technique®, high-volt electrical stimulation with sensory settings, and cyclobenzaprine HCL 10 mg tablets prescribed by the physician. Uniqueness: The literature reports that Chiari Malformation is most commonly discovered upon evaluation of another pathology. Physicians classify Chiari Malformations by the amount of tissue that protrudes through the foramen magnum. Type I Chiari Malformation is classified by involvement of the cerebellum but not the brain stem and is typically asymptomatic. Type II involves both the cerebellum and the brain stem and is often accompanied by myelomeningocele. Type III is the most serious and includes the brain stem protruding into the spinal cord that can lead to nerve defects. Type IV is the rarest form and is the incomplete development of the cerebellum. Symptoms of Types III and IV include vestibular problems, neck pain, headache, muscle weakness, and tinnitus. Many adults do not report any symptoms until late adulthood. Types I, II, and III of this disease are under reported due the symptoms being associated with other conditions; others experience more severe symptoms and require invasive treatments, such as surgery. Conclusion: Chiari Malformation is difficult to diagnose and practitioners commonly under reported it, as there are no unique symptoms that can lead to a definitive diagnosis. As ATs, we need to be skeptical when patients do not report pain relief with multiple treatments. Ultimately, this led to the diagnosis of this disease in this collegiate swimmer.



QUADRICEPS TENDINOPATHY IN FEMALE COLLEGIATE SOCCER PLAYER

Kanosha Gray (Dr. Lisa Jutte)

Department of Sports Studies

At the end of her sophomore soccer season, a nineteen-year-old, female, center-midfield, soccer player reported increased left (L) quadriceps muscle and tendon pain, particularly after games. Upon evaluation the athletic trainer noted manual muscle test were 3/5 for both quadriceps and gluteus medius muscles, bilaterally. Her history included a bilateral bipartite patella excision and quadriceps tendon reattachment the previous year, while attending another university. After the procedure she was prescribed 0.2mg/h nitrogen patches to be worn 12 hrs/day and 4g voltaren gel to be used 2-3 times daily. She reported this procedure and quadriceps pain at her sophomore preseason physical. The patient was prescribed a rehabilitation program that included pain management, quadriceps and gluteus medius strengthening, modified practices to limit running, and continued nitrogen patch and voltaren gel use. For the remainder of the season, the patient continued to participate in games as tolerated. Due to her previous history and the failure to reduce her symptoms, the athletic trainer referred the patient to the team orthopedic surgeon. Differential Diagnosis: Quadriceps strain, quadriceps tendonitis, quadriceps tendinosis, patellar tendon strain. Treatment: Upon examination the orthopedic surgeon noted no knee effusion, no point tenderness over the lateral patella and normal knee AROM bilaterally. During L knee extension RROM the patient reported pain over the lateral joint line. Both Lachman and anterior drawer tests were negative. A diagnostic ultrasound was ordered and revealed that the L quadriceps tendon was retracted 0.3-cm from where the quadriceps tendon was sutured to the patella tendon, indicating the tendon healing had failed. After reviewing the patient's past history and the ultrasound images, the team orthopedic surgeon referred the patient for an MRI of her quadriceps tendon and the accessory lateral facet of the bipartite patella. The patient was diagnosed with quadriceps tendon detachment and degeneration. A platelet rich plasma (PRP) injection was recommended and performed on L quadriceps tendon. The patient began a rehabilitation program one week post injection. The patient's rehabilitation in the first month focused on quadriceps strengthening and knee AROM, as well as hip flexion, extension, abduction, adduction and plantar flexion strengthening. The patient received her second PRP injection six weeks after the initial injection. The patient's rehabilitation program advanced to include increased volume of existing exercises and additional quadriceps strengthening exercises: Total Gym® squats, 6 inch step-ups and walking lunges. Six weeks later, the patient received her third injection. The patient received her fourth and final injection occurred six weeks after the third injection. The patient continued her rehabilitation program at home over the summer for the following two months. The patient returned for pre-season conditioning, and showed progress in sprinting and cutting, which led to her clearance for participation in soccer specific drills. She progressed to full, pain free game participation nine months after her first PRP injection. Uniqueness: It is rare for bipartite patella to be symptomatic. Typically only 2% of the population are symptomatic and it is nine times more common in males than females. Bipartite patella is most commonly discovered in the superolateral portion of the patella while examining the knee for another traumatic injury. Forty-three percent of people diagnosed with bipartite patella experience it bilaterally. Conclusion: Despite the surgical repair of the quadriceps tendon, this patient remained symptomatic until PRP injection were included in her treatment plan. It is important for the athletic trainer to consider PRP injections for tendinopathies that have not healed correctly. In this case, PRP allowed for pain free return to soccer activities.

Biology



ALLELE FREQUENCY OF SINGLE NUCLEOTIDE POLYMORPHISMS RELATED TO OPIOID ADDICTION IN DIFFERENT GLOBAL POPULATIONS

Anna Goetze, Shannon Carney, Alayna Romer (Dr. Jennifer Robbins)

Department of Biology



Opioid addiction and abuse has become a vital issue in the United States because from 1998 to 2010 there was a 178% increase of nonmedical use of prescription-type pain relievers (Laxmaiah et al., 2012). The use and abuse of substances has three main contributing factors: environmental, drug induced, and genetic factors which includes about 40-60% of the risk of developing addiction (Kreek et al., 2005). Our research focused specifically on single nucleotide polymorphisms (SNPs) associated with opioid addiction. The 1000 Genomes Project database provided data separated by ancestry. Correlations between the five ancestries (Africa, America, East Asia, Europe, and South Asia) and specific SNPs were investigated. The relevant SNPs analyzed in this study were OPRM1 A118G, ABCB1 G2677A/T, ABCB1 C3435T, and CYP3A4*1G (Wang et al., 2016) as well as OPRD1 variants rs1042114 and rs2236857 (Crist et al., 2013) all of which previous research has supported a connection to increased susceptibility to opioid addiction. Our research found that Africa was the most significantly different from the other ancestries. The analysis also revealed that, compared to the global allele frequencies, South Asia had the highest aggregate prevalence of risk alleles. Further collection of genomes in countries where opioid addiction is on the rise could help better assess the role a person's genetic ancestry has on their susceptibility to opioid addiction.

INFLUENCE OF COMMON FOOD PRESERVATIVES ON THE GUT MICROBIOTA

Brenna Schutzman, Meghan Berry, Erris Rowan (Dr. Jennifer Robbins)

Department of Biology

Recent studies have shown a correlation between the composition of an individual's distal gut microbiota and their weight. The two prominent phyla that make up the human gut microbiota are Bacteroidetes and Firmicutes. Human twin studies have shown that a change in the ratio of Bacteroidetes to Firmicutes is correlated to the leanness or obesity of an individual. From the 1960s to now, obesity has been on the rise in the United States. Also around this same time, preservatives in food became a staple in the "Western" diet. Relating the three components: human microbiota, increased rates of obesity, and preserved foods, our research team speculated that preservatives could play a role in shifting the ratio of these crucial gut microbiota. We tested the hypothesis by testing the dose-dependent effects of three common food preservatives (EDTA, sodium benzoate, and sodium nitrate) on *Lactobacillus acidophilus*, a Firmicutes, and *Bacteroides ovatus*, a Bacteroidetes. Spectrophotometry was used to quantify the amount of bacterial growth. We then compared the differences in growth rate between the two genera in the presence of those preservatives. Our work could suggest a new way in which processed food influences human health.



ANALYSIS OF PROMOTER EXPRESSION OF DNA METHYLTRANSFERASE 1, 3A, AND 3B GENES IN THE PRESENCE OF CAFFEINE

Monica Mannings (Dr. Christopher Wendler)

Department of Biology (Shands Hospital-Pediatrics Rivkees Lab)

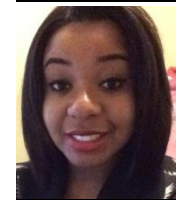
DNA methylation, an epigenetic modification process, is essential to the differentiation of cells during embryogenesis and during cell replication. DNA methylation is carried out by a protein called DNA methyltransferase (DNMT), which primarily methylates CpG islands, located near the promoter sequences of genes. Recent studies investigating the harmful effects of caffeine intake on DNMT expression during the early stages of embryonic development have shown an upregulation of DNA methyltransferase activity in regions with high levels of CpG islands, causing the silencing of genes that are critical to the development and morphology of the heart. This study was aimed at investigating the effects of various levels of caffeine exposure on the expression of the promoter sequences of two DNMT genes: DNMT3a and DNMT3b. Two different promoter regions were analyzed, one more upstream from the transcription start site, and one more downstream from the transcription start site. Following the results of a Secreted-Pair Gaussia Luciferase Assay, it was determined that the expression of the DNMT3a promoter that was more upstream from the transcription start site was upregulated in the presence of caffeine ($p=0.0035$).



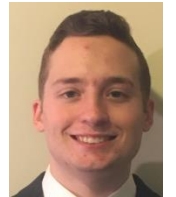
SOCIOECONOMIC DETERMINANTS OF HIV RISK IN RURAL VS. URBAN U.S. COUNTIES

Mundayi Nlandu, Nnenna Ifeanyi, Tamara Mahmoud, Mari Price (Dr. Jennifer Robbins)

Department of Biology



There exists a misconception that the growing HIV population is due to irresponsibility and risky behaviors undertaken by individuals. This attitude ignores complex sociological factors that influence the risk environment, both increasing the probability of risky behavior and the risk involved. Previous research has shown the importance of socioeconomic factors in differences in HIV prevalence across countries as well as in metropolitan cities throughout the U.S. However, there is a need for greater information about how risk environments within a country or region differ. We therefore examined HIV prevalence in rural and urban counties within the United States as a function of several key socioeconomic variables. Overall, our results indicated that income inequality and education levels influenced HIV prevalence more significantly in urban counties while poverty had more significant effects in rural counties. The ratio of adult males to females played an important role in both.



HABITAT QUALITY AND MACROINVERTEBRATE COMMUNITIES WITHIN STREAMS OF THE MILL CREEK WATERSHED, CINCINNATI, OHIO

Kyle Madoni, Sophie Racey (Dr. Mollie McIntosh)

Department of Biology



The Mill Creek Watershed has been exposed to urbanization and suffered from resulting runoff, sewage, and channelization as it flows through the Greater Cincinnati area into the Ohio River. The main objective of this study was to obtain baseline data on habitat quality and macroinvertebrate communities within the Mill Creek Watershed. Single assessments were conducted at a total of nine sites found within four streams of the watershed from July 11-16, 2016. Habitat metrics were assessed using the Ohio Qualitative Habitat Evaluation Index (QHEI) protocol that inferred habitat and stream quality. At each site, three quantitative macroinvertebrate kick samples were collected in separate riffle habitats and one qualitative macroinvertebrate sample was combined from all stream habitats present (riffle, run, pool, glide, and margins). All macroinvertebrates were then identified to family level. Habitat quality was highly variable across all sites, both within and among streams, with QHEI scores ranging from “very poor” to “excellent”. A total of 6,951 macroinvertebrates were identified, representing 50 distinct families, and were dominated by the Chironomidae, Hydropsychidae and Baetidae. Macroinvertebrate metrics were also highly variable across the nine sites probably due to the combined effects of multiple, variable stressors present throughout the watershed.



LARVAL MOSQUITO ABUNDANCE AND WEST NILE VIRUS POSITIVITY IN WETLANDS OF SOUTHWESTERN OHIO

Alexander Reitz, Seth Buchholz (Dr. Mollie McIntosh)

Department of Biology



West Nile Virus (WNV) is transmitted horizontally between adult mosquitoes and birds; however, evidence suggests that WNV may also be vertically transmitted, from adult mosquito to offspring. Once infected, adult mosquitoes can then transmit the virus to humans, with over 42,694 human cases being reported in the United States since the introduction of WNV in 1999. Vertical transmission of WNV has been demonstrated in a laboratory setting with little evidence of this collected in nature. The objective of this study was to assess larval mosquito populations overtime and to test for the presence of WNV in these wild populations. Samples were collected from May through October 2014-2016 at four wetland sites from the Cincinnati, Ohio, region. Larval mosquito samples were collected from shallow-water edge habitats along the perimeter of each wetland to assess mosquito population abundance and test for WNV presence via PCR testing. At each site larval populations were dominated by *Aedes*, *Culex*, and *Anopheles* mosquitoes with variable abundance observed overtime. Positive WNV larval mosquito populations were identified at all sites at variable times of the year in 2014 and 2015, with no positive populations identified in 2016.



ALLELOPATHIC EFFECTS OF AMUR HONEYSUCKLE (LONICERA MAACKII) ON SEED GERMINATION AND GROWTH

Preeya Waite, Maggie Hale, Haley Jerabek, Charlie Obermiller, Grant Parrelli (Dr. Brent Blair)

Department of Biology



Amur honeysuckle (*Lonicera maackii*) is a shrub originally introduced into North America from northeastern Asia in the late 1800's. It was first planted as an ornamental and to prevent erosion. However, it quickly spread and became a serious problem for forests of the Eastern United States. The purpose of this study was to examine the allelopathic effects of amur honeysuckle on plant germination and growth. We used a pot experiment that varied, seed (radish and honeysuckle), soil type and watering solutions to achieve this goal. Germination was measured daily, and growth was measured at the end of the experiment by comparing treatment dry weights. We hypothesized that radish seeds grown in soil collected near honeysuckle plants (HS-soil), or watered with water containing a honeysuckle-leaf extract (HS-water) would have a lower germination rate and lower dry weight than the control. In contrast, we also hypothesized that honeysuckle seeds grown in HS-soil or watered with HS-water would have a higher germination rate and a greater dry weight than the control. Results for this experiment are pending.





EFFECTS OF STREAM HEALTH ON POPULATION SIZE OF SOUTHERN TWO-LINED SALAMANDER (*EURYCEA CIRRIGERA*) IN CINCINNATI, OH

Victoria Kiraly, Cassandra Nieman (Dr. George Farnsworth)

Department of Biology



Anthropogenic activities, such as habitat loss and degradation, have caused widespread amphibian population declines. The Southern two-lined salamander (*Eurycea cirrigera*) is a notable biological indicator of stream quality because it is sensitive to environmental stress and deterioration, which is often first detected at the population level. To investigate the effects of habitat degradation on salamanders, a long-term observational experiment over the 2016-2017 school year was conducted. Varying locations in Greater Cincinnati were sampled in regards to canopy coverage, air and water temperature, pH level, and water depth and flow. These characteristics were measured primarily at two different creeks, which were selected for due to their proximity to each other and to urbanized areas. The evaluations of these habitats were then compared to population sizes obtained through hand-capture techniques. Rocks were turned over to look for salamanders for 30 minutes at each site during each sampling. Results have disclosed an independence between *E. cirrigera* population size and weather, canopy coverage, or pH. However, these factors had little variation over the period of study. Limited data suggests slightly higher salamander population densities in the tributary of Little Duck Creek; however results are not significant, so a preliminary study has been designed to continue in the long term, looking at more degraded/polluted creeks in order to investigate a possible correlation between population size and stream health and habitat characteristics.



SUSTAINABLE ALTERNATIVES: BIFUMIGATION

Rachel Fletcher (Dr. Kathryn Morris)

Department of Biology

The plant genus, Brassica, is renowned for its glucosinolate production. Brassicas can be employed in crop rotation to increase yield and reduce pathogens in the soil. When brassica tissue is damaged, glucosinolates react with myrosinase enzymes producing isothiocyanates. These toxic isothiocyanates volatilize and fumigate the soil. Thus, simply tilling brassicas into the soil after harvest has become a recognized method of pathogen control. Certainly, there is much scientific literature published on this topic. However, there has not been a comprehensive analysis prepared from this data. Since harsh pesticides such as methyl bromide are soon to be illegal, this meta-analysis will provide a quantitative analysis of the effectiveness of various methods of biofumigation. This study has examined the effects of species, dosage, exposure time and pathogen type on the efficiency of brassica biofumigation. A comprehensive evaluation extending over three years of data collection and 300+ experiments has been analyzed for this purpose.



RESPONSE OF ADULT ASIAN LONGHORNED BEETLES TO ISOTHIOCYANATES IN LABORATORY BIOASSAYS

MacKenzie O'Kane (Dr. Ann Ray)

Department of Biology

Anoplophora glabripennis (Motschulsky), commonly known as the Asian longhorned beetle (ALB), is a destructive invasive pest. ALB is native to China, and a population of ALB has established in Claremont County, OH. Beetle larvae most likely entered Ohio in solid wood packing material from a shipment from China. Monitoring for adult ALB is difficult because pheromone-baited traps are not very effective in the field. The discovery of a chemical attractant for adult ALB to traps would improve monitoring for ALB in and around quarantine areas. Thus, we assessed the response of ALB adults to isothiocyanates, a class of previously unstudied potential attractants that are the breakdown products of glucosinolates. Some insect species, like cabbage aphids, sequester glucosinolates from their host plants. If aphids are attacked, sequestered glucosinolates react with endogenously produced myrosinase to produce isothiocyanates (ITCs), which act as an alarm pheromone. Genes for the myrosinase enzyme were found in the genome of ALB. However, ALB do not feed on plants that produce glucosinolates, nor do ALB sequester glucosinolates. We hypothesized that ITCs may therefore play a role in chemical communication in adults of ALB, and might act as attractants. We tested the response of both virgin and mated male and female adults of three ITCs in a Y-tube choice bioassay. Adults of neither sex were significantly attracted to any ITCs tested in this experiment.



RELATIONSHIP BETWEEN MUSCLE FATIGUE AND ESTROGEN LEVELS DURING THE MENSTRUAL CYCLE

Corey Mulvey, John Rolfsen (Dr. Jennifer Robbins)

Department of Biology



Estrogen is the primary female sex hormone involved in many known physiological functions. However, it is also the subject to unknown functions. Recently, estrogen has been discovered to generate stronger binding sites between the actin and myosin heads of a sarcomere when present as opposed to being absent. High estrogen levels can contribute to an increased muscle fatigue resistance. In this study, 7 women and 6 men were tested for muscle fatigue resistance throughout a one-month period. The female participants were tested twice during their menstrual cycle. When estrogen levels were at their highest and lowest. Males were tested twice with a gap period of two weeks and used as the control. A hand dynamometer recorded the force of contraction for sixty seconds when squeezed by participants. During the late follicular stage women's fatigue resistance was 11.82% better when compared to the women tested during the early follicular phase. Males had an average percent change from their starting contraction to ending contraction of 68.04%. Females had a difference of 63.12% during the early follicular stage and 51.81% during the late follicular stage showing a possible muscle fatigue difference based on estrogen levels.



MOTOR LATERALIZATION AND PREDATOR EVASION BEHAVIOR OF PODARCIS MUSALIS

Halle Randall, Mitchell Considine, Joe Scharf (Dr. George Farnsworth)

Department of Biology



This study was conducted to test for motor lateralization in common wall lizards (*Podarcis muralis*). Lateralization of the brain is the notion that one hemisphere is more dominant than the other when carrying out actions, skills, or instinctual movements. Previous studies have found a rightward preference in wall lizards' escape route; our research expanded these studies on lateralization of the common wall lizard in an arena setting. Lizards were captured and put in a T-shaped apparatus where they were given the choice to escape down a left tube or a right tube when stimulated by an artificial predator. Our results showed that *P. muralis* preferred a rightward escape route over a leftward route when evading a predatory stimulation. Statistical analysis has been done to determine whether gender or size has a significant relationship with the directional choice of the lizard. Further investigation needs to be conducted with more subjects and tested in the arena to determine if the gender or size of *P. muralis* has an impact on their escape direction.



USING DENDROCHRONOLOGY TO RECONSTRUCT THE TIME OF INTRODUCTION AND SPREAD OF THE? INVASIVE ASIAN LONGHORNED BEETLE (ANOPLOPHORA GLABRIPENNIS MOTSCHULSKY)

Stephen Todd (Dr. Ann Ray)

Department of Biology

In June of 2011, a population of Asian longhorned beetle (*Anoplophora glabripennis* Motschulsky) was detected in Clermont County, OH. Asian longhorned beetle (ALB) poses a serious threat to natural and managed forests in the United States. If new populations of ALB establish or if existing populations expand, the costs of the resulting damage could exceed \$669 billion, and could lead to a mortality rate of 30% of trees in North American hardwood forests (Nowak et al.). Although the status of the infestation in Ohio has been closely tracked by state and federal surveys, it is unclear how quickly the invasion was detected. Using tree ring analysis, we seek to conclusively determine when ALB first established in Ohio. We determined the date that a tree was first infested by dissecting and sanding infested sections of trees, marking oviposition sites and exit holes, and counting growth rings. Our data will be used to help delineate quarantine boundaries for existing infestations and to inform trapping and survey efforts for new infestations.



THE IMPACT THAT CONVENTIONALLY GROWN AND ORGANICALLY GROWN CORNMEAL HAS ON THE GROWTH RATE AND MORTALITY OF A NON-TARGET INSECT, TENEBRIO MOLITOR

Terry Gordon (Dr. George Farnsworth)

Department of Biology

Genetically modified corn is a large part of food produced in the United States. In order to produce insecticides, corn is normally modified to produce proteins from the bacterium *Bacillus thuringiensis*. This protein is poisonous to lepidopteran species, which are common pests for corn plants, and is not supposed to harm other insect species. In this study, the larval form of *Tenebrio molitor*, known as mealworms, were placed on two different diets containing corn. Ten mealworms were placed in ten different containers containing conventionally grown corn (Kroger brand, most likely genetically modified), and the same was done for the other group containing organically grown, non-genetically modified corn (200 mealworms in total). Mealworms were weighed and counted once a week for six weeks. We also compared how quickly the mealworms went through their life cycle. After six weeks, it was found that the group on the conventionally grown diet gained more weight, but had fewer deaths than the organically grown group. Mealworms in the organically grown group had more mealworms progress through their full life cycle, producing two beetles after six weeks compared to zero beetles in the conventionally grown group. This research will provide valuable information regarding the effects that genetically modified organisms have on the health and life cycle of non-target species.

Chemistry



THE OXIDATIVE MECHANISM OF THE COPPER AMINE OXIDASES

Kiera Gazica, Mikaela Saugstad (Dr. Stephen Mills)

Department of Chemistry



Copper Amine Oxidases (CAOs) are a family of enzymes that catalyze the conversion of primary amines to aldehydes and ammonium, while at the same time reducing O_2 to H_2O_2 . These enzymes are found in many different organisms such as bacteria, fungi, plants, and animals. Two cofactors are used by CAOs to carry out this reaction: 2,4,5-trihydroxyphenylalanine (TPQ) and $Cu(II)$. The overall reaction can be divided into a reductive half-reaction and an oxidative half-reaction. The mechanism for the reductive half-reaction is accepted, while the oxidative half-reaction is debated with two proposed mechanisms. This study will examine the role of the metal in the electron transfer from TPQ to oxygen in the oxidative half-reaction of the CAOs. To examine the role of metal in this mechanism, $Cu(II)$ was removed from the active site and replaced with $Co(II)$. After the metal was replaced, the enzymatic activity of the protein was measured. Recent studies have suggested that different CAO homologs may use each of the proposed mechanisms. The purpose of these studies is to gain a better understanding of the oxidative mechanism of a CAO from yeast (HPAO) and from *E. coli* (ECAO). Additional studies with another bacterial CAO homolog (AGAO) have shown that $Co(III)$ could support catalysis in that CAO. We are examining the effect of added H_2O_2 on the activity of $Co(II)$ -substituted versions of ECAO and HPAO to determine if $Co(III)$ can support catalysis in these homologs as well.



BORROWING HYDROGEN METHODOLOGY FOR THE SYNTHESIS OF (+)-KALKITOXIN

Cameron Marcus, Jake Ciricillo (Dr. Richard Mullins)

Department of Chemistry



(+)-Kalkitoxin is a secondary metabolite of the cyanobacterium *Lyngbya majuscula*, which is of synthetic interest because of its neurotoxic properties and potential anti-cancer capabilities. Of particular interest to our research is the synthesis of the amide functional group of kalkitoxin. The synthesis of this component normally requires 4 synthetic steps, thus offering an area for improvement. Borrowing hydrogen methodology is a reaction that occurs via a transition metal catalyzed mechanism that enables the conversion between alcohols and amines in a single step. We are evaluating the potential use of borrowing hydrogen methodology as a means for synthesizing the amide group in kalkitoxin. Before experimenting with the kalkitoxin precursor, we are completing a series of reactions to learn about the borrowing hydrogen reaction and the effects different features of the reactants have on it; such as stereochemistry, chain length, and presence of alkenes. To date, we have had success in producing tertiary amines using this method. Currently, we are attempting to isolate the amide product of a reaction with butyramide and benzyl alcohol. Once successful, we will move on to evaluate the utility of the borrowing hydrogen reaction with other amides as we work toward applying the synthetic step to the synthesis of kalkitoxin.



CO-EXTRACTION OF LEAD AND CADMIUM BY CLOUD POINT EXTRACTION AS A PRE-CONCENTRATION METHOD FOR ANALYSIS BY SQUARE WAVE STRIPPING VOLTAMMETRY

Megan Hawkins (Dr. Adam Bange)

Department of Chemistry

Charged Species, including Pb^{2+} and Cd^{2+} , are soluble in water and therefore cannot easily be separated from aqueous solutions for analysis. Cloud Point Extraction (CPE) is a non-organic phase separation technique that does not use volatile organic solvents and works well to separate metal ions from an aqueous solution. In the CPE for the co-extraction of Lead and Cadmium, a complexing agent such as dithizone is used to form complexes with the metal ions. Such complexing agents bind to the ions thus neutralizing their charges. The surfactant, an example of which is TritonX-114, can then form micelles around the neutral, hydrophobic complex. Micelles form around the cloud point temperature of the surfactant, for TritonX-114 this is around 25°C. Once the micellar phase is formed, it can be separated from the aqueous phase by centrifugation. With the metal ions separated from the original aqueous solution, a new solution of a smaller volume can be made from reconstituting the extracted micellar phase. The reconstituted solution has the metal ions from the sample in a higher concentration. Square Wave Stripping Voltammetry (SWSV) can then be used to detect the metal ions in the pre-concentrated solutions. By prefacing SWSV analysis with CPE pre-concentration it is possible to analyze samples with lower concentrations of Lead and Cadmium. Lowering the detection limit of samples using this technique can allow for the minimization of electrochemical analysis.

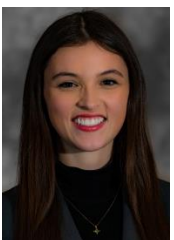


INVESTIGATING BIOPOLYMER COATINGS AND THE CAPABILITY OF USING A 3D PRINTER & AN ENGRAVING LASER IN THE FABRICATION OF MICROFLUIDIC DEVICES

Olivia Thomas (Dr. Supaporn Kradtap)

Department of Chemistry

Microfluidics is the engineering of manipulating and controlling fluid flow in networks of channels with small dimensions from tens to hundreds of micrometers. Microfluidic devices can reduce reagent consumption, allow well controlled mixing, and can be applied for various downscaling chemical/biochemical analyses. Typical low cost polymers used in the fabrication of microfluidic devices, polymethylmethacrylate (PMMA) and polydimethylsiloxane (PDMS), can dissolve or swell in some common organic solvents which limit their uses to mainly aqueous based solutions. This research focuses on ways to expand the list of organic solvents for use with the microfluidic devices. A hydrophilic biopolymer coating of alginate and chitosan was tested for its effectiveness in protecting the surfaces of PMMA and PDMS. Various coating concentrations and application methods were tested and it was found that a concentration of higher than 2%w/v of alternating layers of chitosan/alginate was the best method. However, a way to smooth the coating still needs to be researched. Another objective of the research is to investigate the capability of a 3D printer and an engraving laser to aid in the fabrication of the devices. Two software programs, TinkerCad and OpenSCAD, were employed. The latter, although more complicated, is more effective in building and scaling the design. A surface profiler is used to evaluate the size of the channels. The 3D printer can be used to print the mold for making channels, down to ~350 μM , on the flexible PDMS. An engraving laser can be used to create much smaller channels on the hard polymer PMMA and glass. Understanding the capabilities and limitations of the facilities will enable planning for a more complex design of the network channels in future works.



PROBING THE INTERACTION OF VANADATE WITH ALCOHOLS AND AMINES WITH ^{51}V -NMR SPECTROSCOPY: AN INORGANIC LABORATORY EXERCISE

Megan Donaldson, Allison Taylor (Dr. Craig Davis)

Department of Chemistry

An inorganic laboratory exercise using ^{51}V -NMR spectroscopy to determine equilibrium constants of vanadate derivatives has been developed. The orthovanadate anion, VO_4^{3-} , is isostructural to the phosphate anion. In aqueous solution orthovanadate can form esters with compounds having an hydroxyl group, such as alcohols and hydroxylamines. In a ^{51}V -NMR spectrum the signal from the ester is always downfield from the orthovanadate resonance. The relative concentration of the two components can readily be determined by integrating their respective peaks. Plotting the ratio of the ester-to-vanadate concentrations vs. the ratio of the ligand-to-water concentrations gives the equilibrium constant for the formation of the ester. The chemical shifts and absolute intensities of the ^{51}V -NMR resonances of both orthovanadate and its derivatives are highly pH dependent; also, orthovanadate forms oligomers at high concentrations. Thus, one of the greatest challenges was determining the optimal conditions to ensure high signal-to-noise ratio and baseline separation of the peaks. Vanadium-amine complexes have optimal peak separation and intensity near pH 9, while vanadium-alcohol complexes are best near pH 11. In addition, oligomer formation can be suppressed if the orthovanadate concentration does not exceed 10 mM. The solutions are efficiently prepared as the vanadate solution and the alcohol or amine can be directly added to an NMR tube with a micropipette. The modest cost of the reagents, coupled with small amounts used by each student, make this a cost-effective exercise.





DEVELOPMENT OF AN INSTRUMENTAL ANALYSIS LAB FOR THE DETERMINATION OF ORGANO-ARSENIC COMPOUNDS

Shelby Goldsberry (Dr. Barbara Hopkins)

Department of Chemistry

Para arsanilic acid and roxarsone are two very similar organo-arsenic compounds that have been used as animal feed additives in the poultry and swine industry for controlling disease and enhancing feed efficiency. The issue with these compounds is if they transform into their toxic inorganic arsenic form, they can cause potential harm to animals and humans. The objective of this research was to develop an instrumental analysis lab exercise that incorporates a hyphenated technique consisting of high performance liquid chromatography (HPLC) and graphite furnace atomic absorption spectroscopy (GFAAS) to separate and quantify the two organo-arsenic compounds. Solutions of para arsanilic acid and roxarsone were mixed and their wavelengths were determined using ultraviolet visible spectroscopy (UV-Vis). For separation of the two organo-arsenic compounds, two mobile phases were tested on the HPLC hoping to have at least a minute between elutions of the two compounds. Confirming earlier work done in our laboratory the best mobile phase was 70% deionized water, 28% methanol and 2% acetic acid. Using this mobile phase, the two organo-arsenic compounds at very low concentrations were separated and collected. The collection time for para-arsanilic acid was determined to be 1.5 minutes to 3.15 minutes from the time of sample injection to the HPLC, and the collection time for roxarsone was 3.5 minutes to 5.5 minutes. Para arsanilic acid and roxarsone collected samples were analyzed by the GFAAS using a wavelength for arsenic of 193.7 nm and operating the instrument with background correction. To replicate a National Institute for Occupational Safety and Health (NIOSH) method, Glass Fiber filters were spiked with 0.5 times the Permissible Exposure Limit (PEL), desorbed with 75% deionized water and 25% methanol and analyzed with the hyphenated-technique. Standard para arsanilic acid solutions ranging from 0.2 x PEL to 1.0 x PEL were analyzed along with the filters, which showed an average recovery of 79.84%. No data was obtained for filters spiked with roxarsone.



PROGRESS TOWARDS A PLANT EXPRESSION SYSTEM FOR COPPER AMINE OXIDASES

Victoria Doss (Dr. Stephen Mills)

Department of Chemistry

Copper Amine Oxidases are a family of enzymes that catalyze the conversion of primary amines to aldehydes and ammonium, reducing O_2 to H_2O_2 in the process. These enzymes utilize 2,4,5-trihydroxyphenylalanyl quinone (TPQ) and Cu(II) as cofactors. Recent studies have focused on the mechanism of oxygen reduction by CAOs. Surprisingly, homologs from different organisms seem to use different mechanisms for oxygen reduction. In order to gain a better understanding of the mechanism of these enzymes, more homologs must be studied. Since obtaining these enzymes from native sources can be difficult and does not allow for site-directed mutagenesis of the enzymes, this study aims to develop an expression system for CAOs in plants. Initially, we will target hVAP-1 (a human CAO), BSAO (bovine serum amine oxidase), and PSAO (a plant CAO) for expression in *Nicotiana benthamiana* (an Australian relative of tobacco). As a first step in this project, we will set out to express Green Fluorescent Protein (GFP) in *N. benthamiana* as a proof of principle. To do this, a plant expression vector with the gene for GFP will be constructed using NEBuilder Hifi Assembly. The next step in this research is to transform this vector into *Agrobacterium tumefaciens* (a bacterium used to transfer DNA into plant cells) and then to introduce the *Agrobacterium* into the plants through vacuum infiltration. The expression of GFP by the plant will be evaluated using a UV light, since GFP fluoresces. Once GFP expression is successful, this process will be repeated for the different CAO homologs, allowing us to study the mechanisms of these enzymes in more detail.



VITAMIN D AND HUMAN DISEASES

Sofia Dueno (Dr. Stephen Mills)

Department of Chemistry

Most of us know you can get vitamin D from the sun, but how does that happen? Once it is made, what does vitamin D do? The main role of vitamin D is regulation of serum calcium and phosphorous levels in our bodies to maintain bone mineral health. In the absence of vitamin D, bone cannot fortify, and our skeletal system becomes brittle- as with the condition known as Rickets. In the past forty years, vitamin D receptors have been found on other organs that are not involved in mineral regulation and bone health, which suggested that vitamin D could be associated with other diseases such as Multiple Sclerosis, Diabetes Mellitus Type I, Rheumatoid Arthritis, Depression, and Schizophrenia. While these developments are fairly new, an important area of research is quantifying vitamin D levels within the body. Vitamin D can bind to its own binding protein (DBP), albumin, vitamin D receptor (VDR), as well as accumulate in adipose tissue and skeletal muscle. Detection methods struggle to account for all of these forms of Vitamin D. Techniques such as HPLC with either UV/Vis or MS as detectors or ELISA assays have been used to quantify vitamin D levels. A “gold standard” for separation and quantification of vitamin D metabolites is still being developed. Both researchers and physicians struggle to define the therapeutic window for vitamin D. Most of the difficulty lies behind the quantification of vitamin D, because there are simple biomarkers for “healthy” vitamin D levels, and it is also difficult to determine how much vitamin D is too much. These questions regarding measurement and detection are open areas for researchers to contribute to our knowledge of the roles of vitamin D in metabolism and health.



OPTIMIZATION OF VOLTAMMETRIC CO-DETECTION OF LEAD AND CADMIUM USING MINIATURIZED CELL DESIGN

Jeff Letcher (Dr. Adam Bange)

Department of Chemistry

Environmental pollution is one of the most serious problems facing our world today. Heavy metals, which are found naturally in the earth, become concentrated because of the lifestyle and activities of human beings. Electrochemical methods including stripping voltammetric techniques has been seen as a powerful tool for trace analysis of metals. Using this technique allows for higher selectivity and sensitivity which no drawbacks on cost. For the purposes of detecting lead and Cadmium, anodic stripping voltammetry (ASV) is commonly used since these metal particles can be accumulated onto the electrode surface stripped off voltammetrically. ASV allows for a low detection limit and a wide measurement range which provides the greatest criteria to detect multiple-ion analysis. By using a glassy carbon electrode coated with Hg film shows a good selectivity for lead and cadmium determination. The one drawback with this technique is the analysis requires a relatively large sample volume due to the size of the electrode. A way to overcome this problem is to find a way to integrate the electrodes into a small vessel to accommodate small volumes (approximately 400 μ l). Through the technique of 3D-printing, designs of vessels for electrochemistry can be produced with specialized parameters to the finest detail. With the use of 3d-printing, a vessel with dimension to hold a volume of approximately 400 μ l can be produced with a material that can withstand the basic and acidic conditions faced in ASV. Using Acrylonitrile Butadiene Styrene (ABS), an 3D-printing material gives the correct criteria to accomplish these parameters and also allows for great strength in the vessel. By utilizing 3D-printing, ASV is able to be miniaturized.



OPTIMIZING CLOUD POINT EXTRACTION FOR STRIPPING ANODIC VOLTAMMETRY OF TRANSITION METALS

Cooper Quartermaine (Dr. Adam Bange)

Department of Chemistry

One of the most limiting factors to any analytical method is the degree to which matrix interferences can be selectively removed, while leaving the analyte of interest intact. This is especially true in biological and environmental samples, where many competing interferences can affect the integrity of an analysis. Micellar cloud point extraction (CPE) has been shown to be a viable approach to this problem. By selectively forming neutral hydrophobic complexes that aggregate around a surfactant to form a micelle, many competing species that remain dissolved in an aqueous medium can be removed from this solvent free extraction. Complexes have been demonstrated to form between I^- and Cd^{2+} , Pb^{2+} and dithizone, as well as many others. While typical analyses featuring cloud point have focused on atomic absorption spectroscopy, there has been a growing movement to apply this extraction method to sample preparation for electrochemical methods such as stripping anodic voltammetry (SAV). Cloud point and SAV form a natural analysis schema pair, as both are essentially pre-concentration methods to ensure the most recovery of a given analyte. This research looks at different combinations of CPE/SAV in an effort to optimize the extraction process and analysis with SAV. Current analytes of interest include Cadmium and Lead, both separately and with a simultaneous CPE. This research is also of interest for its potential towards miniaturization, and is also an area of interest of this project.

Communications



BEST PRACTICES FOR TEACHING BUSINESS COMMUNICATION STUDENTS TO WRITE WELL-ORGANIZED, VISUALLY ATTRACTIVE, AND READER-FRIENDLY CELL PHONE MESSAGES

Daniel Jaramillo (Dr. Thomas Clark)

Department of Communications

This presentation describes an exercise designed to teach undergraduate business communication students to write email and text messages appropriate for cell phone screens. We describe rubrics for organization, argument and visual design, including the use of headings, bullets, and white space and share examples of “before and after” student messages. Our plan is as follows: We will 1.Share research that shows how and why reader comprehension drops when readers view cell phone messages. 2.Describe the process we employ to teach students how to improve reader comprehension in this medium by providing rubrics for organization, argument and visual design, including the use of headings, bullets, and white space. 3.Display the graphics we created to implement these rubrics, including separate ones for I-phone and Android phones and then show examples of “before and after” student messages created specifically for cell phone display. 4. Invite session attendees to share their feedback on our approach and subsequently inquire about their experiences and best practices in teaching written communication skills in a digital media environment.

Classics

A MULTI-FACETED ANALYSIS OF THE EUCHARISTIC HYMNS OF SAINT THOMAS AQUINAS

David Nussman (Dr. Thomas Strunk)

Department of Classics

Saint Thomas Aquinas wrote five Eucharistic hymns, and four of them are included among the liturgical texts for the Feast of Corpus Christi. This essay seeks to analyze these hymns using a ‘classical’ methodology. In short, this ‘classical’ methodology consists of paying close attention to rhetorical devices—especially the ‘micro-level’ details of diction, syntax, and word-order. The first chapter argues that St. Thomas approached his hymns with a mindset comparable in some respects to that of the ancient Roman poets. The essay then analyzes the stylistic features in the second chapter. Lastly, the third and final chapter shows that teachings emphasized in the *Summa Theologiae* receive similar emphasis in these hymns.

A PSYCHOLOGICAL AND PHILOSOPHICAL UNDERSTANDING OF DEATH: AN ANALYSIS OF PLATONIC AND EPICUREAN PHILOSOPHY IN MODERN AMERICA

Alexina Hupp (Dr. Thomas Strunk)

Department of Classics

This paper investigates the application of two ancient philosophical accounts of death and the interaction with modern psychological principles on death and grieving. Chapter one summarizes three important psychological principles regarding death that are important to our modern understanding of approaching both our own death and grieving the death of others. This paper uses primary sources to explain and analyze the philosophical accounts of Plato and Epicurus specifically related to their ideas of the soul, immortality, death, and afterlife. Chapter two focuses on Plato's philosophy of death using the *Phaedo* and analyzing Socrates' conversation before death. He proposes the idea that although the body is mortal, the soul is immortal and therefore lives on through other men. Chapter three focuses on Epicurus' philosophy displayed in his letters and fragments proposing the idea that the soul cannot function nor exist without the body, and consequently, death should not be feared because it is the ultimate end. Finally, chapter four analyzes popular culture to describe how psychological principles as well as both the philosophies of Plato and Epicurus influence the society of modern America in coping with death. The purpose of this paper is to describe the various approaches to understanding death (three psychological and two philosophical) and how each approach serves an important function within our society.

THE EIGHTH SACRAMENT? THE EVIDENCE OF HINCMAR OF RHEIMS

Doyle Baxter (Dr. Michael Sweeney, Dr. Thomas Strunk, Dr. David Mengel)

Department of Classics and Modern Languages, Philosophy

The Catholic Church did not dogmatically define the list of seven sacraments until the Council of Trent in the 16th century, marking the culmination of hundreds of years of theological study and reflection upon sacraments. After the definition of seven, French theologians argued that the coronation of their king was an eighth sacrament. In this paper, I contend that Hincmar of Rheims, his theology of kingship, and the coronation rites that he compiled are likely responsible for the French claim. Hincmar was the Archbishop of Rheims from 845 until his death in 882. During his time as archbishop, he compiled four unique coronation rites: two for queens and two for kings. Hincmar's are the oldest surviving coronation rites from continental Europe and they serve as the foundation of nearly all traditions of European coronations, including those of the French kings, the Holy Roman emperors, and still-reigning English monarchs. By closely analyzing Hincmar's *De Ordine Palatii* (DOP) and his *Ordo* of Charles the Bald (OCB), I was able to determine that Hincmar likely believed his coronation rites to be sacraments. I argue that the DOP contains Hincmar's theopolitical vision: an ideal conception of the Church and the king's government working in tandem to bring about the salvation of souls. His theology is wrapped up in his politics and vice versa. This analysis yielded a unified understanding of the distinct offices of kingship and priesthood. The OCB shows, in practice, the theories of the DOP. By closely reading the OCB and the historical circumstances that surrounded the celebration, I was able to clearly highlight Hincmar's two-fold understanding of coronation: there is the unction, the ostentatiously sacramental part of the rite wherein a man becomes a king in the sight of God, and the crowning, a purely juridical act wherein a man becomes a king in the eyes of his people. In parsing this distinction, I made two notable contributions to the secondary literature: firstly that Hincmar may have used the Old Testament precedent of Aaron's ordination as inspiration for the rubric of his unction of Charles the Bald; secondly, that the actual crowning was not done by Hincmar, but by a group of bishops from the province of Trier. Hincmar's attitudes and legal maneuvering, both in the DOP and OCB, can serve as the primary evidence that he believed his coronations to be sacraments. This fact becomes even more convincing when one considers the immediate effects of coronation rites after Hincmar's death in 882 and Charles the Fat's deposition in 887. When the Franks outlived the family that was meant to rule over them as their kings forever, the people and the clergy had to find a new way to establish the legitimacy of a monarch. Thanks to the work of Hincmar, that legitimacy came to be sourced in a sacrament of the Church: the sacrament of coronation.



BEING SATYRICAL: A STUDY ON GREEK SATYR PLAYS IN THE CONTEXT OF HISTORY

Eric Minion (Dr. Thomas Strunk)

Department of Classics and Modern Language

One of the greatest difficulties that arise when studying satyr plays is the lack of primary source material. Of all the satyr plays written in the Attic period, only one full play remains: the Cyclops by Euripides. Other than this, all that remains for us to study is fragments of previously written plays by the famous tragedians: Aeschylus, Sophocles, and Euripides. Because of this, I turn my study to look at satyr plays not only as a genre in itself, but also in its specific relationship to the other genres of the time; namely, tragedy and comedy. It is clear that satyr plays were uniquely tied to the genre of tragedy, as the plays were performed in conjunction with each other. To gain a better understanding of what role in theatre satyr plays fulfilled in Ancient Greece, it is important to look at satyr plays in the context of history. From tragedy to comedy to centuries of theatre beyond, satyr plays can be analyzed not simply by the fragments and plays we have left, but also by the impact they had on the other genres of the time



MODE OF OPERATIONS: A CRITIQUE OF AN AGONISTIC VIEW OF THE GREEK MUSICAL MODES

Robert Crawford (Dr. Thomas Strunk)

Department of Classics

Music has the power to transcend the confines of mere spatial geometry into the bounds of philosophy and emotion. In the views of the ancient philosophers Plato and Aristotle, music, namely the Greek modes, is valuable pedagogically in two ways: first, as a means to knowing the Good, e.g., the Dorian and Phrygian modes, and second as a means for suiting people for political life. Since their goal is to educate future rulers, Plato and Aristotle need to heighten some but censor other musical modes, e.g., the Lydian and Aeolian modes, due to some of the unsavory feelings, or affects, which those modes produce. Since musical modes take on moral and social roles, the emotions they evoke become vastly important due to the ancient connection between the “beautiful and the good” (καλὸν ἀγαθόν). By contrast, a purely aesthetic view of the modes provides a much more inclusive experience of all the modes, but disassociates the beautiful from the Good. This focus on intellectualism downplays the emotional effects which are felt in the arts, e.g., the musical modes. Analyses of both Platonic-Aristotelian and aesthetic views of the modes results in the need for a middle ground that presents a more holistic approach as opposed to a competitively agonistic understanding of the philosophic and musical intersections of the modes.

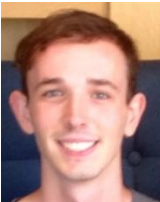


MIGRATION AND ITS IMPACTS ON THE LABOR MARKET OF ROME DURING THE LATE REPUBLIC AND EARLY EMPIRE

Kerry Campbell (Dr. Thomas Strunk)

Department of Classics

As one of the most economically developed cities in the ancient world and with an estimated 1 million inhabitants by the 1st century BC, Rome required a major labor market for both residents and new immigrants alike. Although statistical data on the labor market is limited, the effects of migration on the urban labor market can be analyzed by applying a theoretical economic model that measures immigrants' impacts on the supply and demand for labor. This paper begins by examining the backgrounds, characteristics, and approximate volume of the voluntary migrants and forced migrants (e.g. slaves) to Rome. Then, the supply-demand model of migration is applied to the Roman labor market in order to analyze the impact of immigrants on the observed outcomes, namely the change in the level of employment and in the wage rates for workers. Unskilled migrants increased the competition for jobs between all unskilled urban residents, especially as slaves took up more jobs in household and administrative functions. Slaves who were skilled in production, administration, or finance were able to achieve freedom from slavery and gain citizenship, and often they managed part of their former owner's business or contributed significantly to it. In these respects, slaves and freedmen had considerable benefits from slavery economically and socially, however unconventional that may sound.



ARCHILOCHUS' EFFECT ON THE HOMERIC HERO: TRACKING THE DEVELOPMENT OF THE GREEK WARRIOR

Luke Byerly (Dr. Thomas Strunk)

Department of Classics

The current study examines the Greek soldier through the lenses of two early, influential authors. While Homer set a standard for warriors with the Greek hero, the lyric poet Archilochus permanently altered this standard through his own poetry. Through the demigods in the Iliad, Homer presents an idealistic and fanciful conception of how the Greek soldier should act while Archilochus presents a more realistic and relatable account of the Greek soldier. Archilochus is undoubtedly responding to Homer's presentation of warriors and rejecting the idealistic presentation in favor of a more realistic presentation. The influence of Archilochus' poetry on the Homeric hero can be traced throughout Greek literature. This paper studies the effect of these conflicting authors on the changing opinion of the warrior by identifying the values presented by both of these authors and then identifying similar values within later Greek literature. Specifically, this study identifies the effect of these conflicting opinions on Greek Tragedy and Greek Philosophy by studying Aeschylus, Sophocles, and Plato. The study shows a clear influence of both Homer and Archilochus upon the later authors. The results show that the later authors take a kind of middle ground between Homer and Archilochus that highlights the values of both authors. The resulting warrior is neither obsessed with glory like the Homeric hero, nor willing to forsake their fellow warriors for selfish reasons like the Archilochean hero.

Economics



NEOLIBERALISM AND RISING INEQUALITY

Giovanni Rocco (Dr. Amit Sen)

Department of Economics

In recent years, there has been renewed public discourse around issues of increasing inequality in the United States and elsewhere. Economists, law professors, and social intellectuals such as Joseph Stiglitz, Thomas Picketty, Dani Rodrik, and James Kwak have written extensively on contemporary inequality. The main objective of my thesis is to explore the historic trends in inequality in the United States within the context of philosophical, economic, and political frameworks. I begin with a discussion of the philosophical and economic framework of neo-liberalism. I examine the underlying assumptions of neo-liberal thought, and argue that considerable caution must be taken before using this framework to inform public policy. As Amartya Sen outlines, the neoliberal conception of freedom is inconsistent and incomplete; moreover, this proves to be problematic when implementing economic policy. I will provide a historical narrative of how the neo-liberal framework as provided the basis for more recent public policy initiative in the United States especially in the latter half of the twentieth century with Ronald Regan's tenure at the apex. My analysis will show that the rise of inequality in the United States is due to this implementation of neoliberal public policy. Inequality as manifested through neo-liberalism is harmful to the American economy and, perhaps more importantly, the American democratic system. My analysis, therefore, highlights the need of a new philosophical and economic framework necessary in order to address this issue rising inequality and preservation of the democratic political system of the United States.



YAHOO! FINANCE VS. BLOOMBERG BETA ESTIMATES: WHICH BETTER PREDICTS FUTURE RETURNS?

Carina Madoni (Dr. Julie Cagle and Dr. Brian Balyeat)

Department of Economics

Published betas are frequently used by finance professionals and students rather than calculating their own betas. However, when one searches for published betas, oftentimes large differences in estimation methods exist leading to significant differences in beta estimates between published sources. This research continued the research previously done by Reilly and Wright (1988) and Balyeat and Cagle (2009) regarding beta estimates. This study examined how a subscription-based published source (Bloomberg)—which is widely used by professionals—compares to a free published source (Yahoo! Finance) when predicting future security returns in hopes of determining whether one outperforms another. Ninety companies' beta estimates were gathered on June 6, 2009 for Yahoo! Finance from Balyeat and Cagle's (2009) study and the same ninety companies' beta estimates available on June 6, 2009 were gathered from Bloomberg. Seventy-three companies of the ninety companies from 2009 still existed in 2016. Predicted and actual returns were calculated using the CAPM equation for both Yahoo! Finance and Bloomberg for five different holding periods and three market capitalization indices. The difference in estimated returns using the CAPM equation relative to the actual returns was evaluated by testing for significant differences between means in returns. Even when isolating the effect of beta estimates on the CAPM equation, there are no statistical differences between each of the methodologies in terms of predicting returns across all holding periods. Thus, there does not appear to be an advantage to using Bloomberg, a paid source, over Yahoo! Finance, an unpaid source, because one does not statistically outperform the other in terms of beta estimates for forecasting returns using the CAPM equation.

Finance

THE STEPHEN S. SMITH CENTER FOR THE STUDY OF CAPITALISM AND SOCIETY

Misha Balkowiec, Shannon Price, Cody Boyer, Dan Celani, Austin Fry, Jorge Sanchez, Luke Smith, Taylor Crawford, Jocelyn Chan, Jessica Robinson, Peter Williams, Kevin Mulcrone, Connor Lang, Josephine Lando, Ben Moore (Dr. R. Stafford Johnson)

Department of Finance

The Stephen S. Smith Center for the Study of Capitalism and Society is currently a collection of students focused on authoring publications regarding social, economic, and political issues. What we have gathered here is a collection of those writings that span a broad array of issues.

HAB



OUCH! ANCIENT TOOTHACHE AND THE FORMATION OF DENTISTRY IN PHARAONIC EGYPT, CLASSICAL GREECE, AND THE ROMAN EMPIRE

Andrei Dragomer (Dr. Thomas Strunk, Dr. Shannon Hogue)

Department of HAB

Dentistry develops as a result of the slow, steady accumulation of knowledge and practice over a considerable period of time. In Pharaonic Egypt (ca. 1650-1292 BCE), dental treatment consists of using carbohydrate and honey based pastes in an attempt to temporarily relieve toothache. It is within this time period that dental treatment begins a transformation, shifting away from treatment rooted in a magical understanding of the world, towards one more rooted in a rational process. As time progresses, in Classical Greece (ca. 460-322 BCE) and slightly beyond (ca. 304-250 BCE) this shift towards the rational continues, as philosophers and physicians alike endorse an atomistic understanding of the world, bridging the relationship between the mouth and body. From this same time, leaden tooth extraction forceps and dental prostheses are found, revealing the increasingly operative nature of dental treatment. A few hundred years after this, with Greek physicians leading the way, dentistry becomes fully developed in the Roman Empire (ca. 116 BCE-210 AD). Physicians of this time become more astute in their observations of the mouth discerning correct dental anatomy while also recognizing the etiology of infection. Direct archeological remains of teeth extraction in Rome suggest the existence of a knowledgeable, skilled physician. It is at this time that such treatment can be fully recognized as the dentistry we know today.



DIVINE DELIVERANCE: A NEW LOOK AT EURIPIDEAN TRAGEDY THROUGH AUDIENCE INTERPRETATION

Samantha Pukys (Dr. Thomas Strunk)

Department of HAB/Classics and Modern Languages

Euripidean tragedy is often interpreted as anti-war propaganda, because the tragedian himself was known to be opposed to the Peloponnesian War. However, I argue that a semiotic analysis of the divine figures, Euripides's signature characters, combined with the historical context of the plays produces an interpretation of pro-war sentiment. The semiotic methods utilized in this study are spatial and metaphorical. They reveal power dynamics, social constructions, and other important aspects of the divine characters. Once this analysis is complete, I draw parallels between the semiotic findings and the historical context surrounding the original performance of the play. My research explores two Euripidean plays: *Hippolytus* and *The Bacchae*. *Hippolytus* was first staged in 428 BCE, the same year as the Mytilene Revolt. *The Bacchae* was Euripides's last play, staged posthumously by a family member in 405 BCE, one year before the end of the war. However, before investigating these plays and their historical contexts, I discuss the political nature of the religious festival, the Great Dionysia, and the civic religion of 5th century Athens. This information supports the interpretations that develop in the following chapters by affirming expectations held by the Athenian audience members as they watch the tragic performances. Despite the known agency of Euripides, I demonstrate that his political beliefs do not translate into the message received by the audience. This study reveals a well-supported understanding of audience interpretation and message conveyance of pro-war sentiment during the 5th century, adds new insight into a well-established scholarly conversation.

Health Services Administration

SERVICE LEARNING STUDENTS IN BS-HEALTH SERVICES ADMINISTRATION QUALITY MANAGEMENT CAPSTONE IMPLEMENT STRATEGIES TO IMPROVE IMMUNIZATION RATES AT AGE 2 YEARS IN UNDERSERVED POPULATIONS

Enlara Ndum, Ariel Hoeldtke, Michaela Norris, Colleen Staunton, Michael Bosse, Hanna Martin, Audrey Oyer,
Jesse Rhodebeck, Lena Stringham, Emily Wagner, Desiree Dick, Emma Gripshover, Paul O'Hara

Department of Health Services Administration (Dr. Eileen Alexander)

Vaccination is estimated to prevent an estimated 322 million illnesses, 21 million hospitalizations, and 732,000 deaths among U.S. children during their lifetimes. From 1994-2013, children living below the federal poverty level had lower vaccination coverage compared with children living at or above the poverty level. Surprisingly, 28.4% of U.S. children under age three are not fully immunized. Reaching and maintaining adequate threshold coverage across all ethnic and socioeconomic groups is needed to achieve herd, or community, immunity and prevent resurgence of vaccine-preventable diseases. The Healthy People 2020 (HP) goal for pediatric immunization is 80% and herd immunity requires ~80-95% coverage, depending on the disease. Federally Qualified Health Centers (FQHC), such as Primary Health Solutions (PHS), provide vaccines at a nominal sliding scale for all families, regardless of insurance coverage. In Butler County, local poverty levels reach 78% and PHS serves more than 27,000, including 12,000 children, many of whom are uninsured. Now in its third year, Xavier undergraduate students in Health Services Administration collaborate with PHS leadership, staff and healthcare providers to improve immunization rates. The long-term goal of PHS is well-aligned to surpass the HP goal to increase immunization rates to 85% for children two years or older at all PHS centers. To achieve this, PHS opened three new school-based health centers (SBHC) in 2016. In this 16 week quality and process improvement study, students aimed to measure baseline rates of vaccination coverage at PHS centers, provide analysis of root causes, propose solutions and implement measurable changes to increase the percentage of children who are fully immunized by two years of age by 30% above baseline rate.

History



AN EXAMINATION OF RIGHT-WING POPULISM IN THE UNITED STATES: PARALLELS BETWEEN MARX'S "PETTY BOURGEOIS" & THE TEA PARTY

Hayes Cheatham (Dr. Suparna Chatterjee)

Department of History

The purpose of this paper is to examine the parallels between the "petty bourgeois" described by Marx in the *Communist Manifesto* and the modern Tea Party movement. Through the presentation of data, it will be established that the reactionary, right-wing populist movement of the Tea Party is motivated by anxieties and misconceptions similar to those of "petty bourgeois". Additionally, an argument will be presented that the populist movement has been co-opted in a fashion that parallels Aristotle's account of Demagoguery. Structurally, this paper will demonstrate that the rise of the movement was a response to the election of President Obama. Furthermore it will examine the demographics of Tea Party supporters and their ideological motivations by drawing on multiple sources of research, polling, and public accounts. The conclusion will explore why the campaign messaging of President Donald Trump was so compelling to this important segment of the Republican Party and the potential implications of the President's populist support.



Seven Pillars of Destruction: T.E. Lawrence's Contribution to Counterinsurgency

Mathew Gibson (Dr. Rachel Chrastil and Dr. Erik Linstrum)

Department of History

This project argues that T.E. Lawrence's contribution to counterinsurgency made war limited, precise, and bloodless, and his legacy was carried on, but modified to aid a colonial war machine. Consequently, his methods evolved into destructive warfare that disturbed civilians, and his methods are still present in United States contemporary examples such as Iraq in 2003. I used primary sources from the University of Virginia's Special Collections library such as letters written between Liddell Hart, a famous military thinker, and Lawrence. I also use newspaper articles that illustrates Lawrence's discontent with the military in the Iraqi revolt and reiteration as to how he wanted it done. In addition, U.S. war manuals from 2006 were used to illustrate how Lawrence's "cultural awareness strategy" would help U.S. soldiers win the "hearts and minds" of the civilian population. Before Lawrence, British counterinsurgency followed the maxims of Carl von Clausewitz's theory of absolute war. Lawrence argued for the following reforms: reduce infantry units by using small-mechanized infantry, expand the role of the British Royal Air Force, psychological warfare and become knowledgeable about colonized people's culture. The British misinterpreted Lawrence's tactics, which are evident in the Iraqi Revolt of 1920. They valued aerial bombardment as psychological warfare to deter civilians from joining insurgencies, which left them victim to indiscriminate bombing. The same strategy was used in Orde Wingate's Palestinian campaigns in 1939, which had the same results for civilians as Iraq in 1920. The United States took a subtler approach in Iraq in 2003 and focused on Lawrence's tactics of being culturally knowledgeable. These tactics failed the United States because they were dated, and the demographics were not the same. In the end, Lawrence's strategies were misinterpreted, did more harm than good, and created more insurgencies than preventing them.

WHY ARE LAW SCHOOLS NOT DIVERSE?

Carmen Brown (Dr. Steven Paul O'Hara)

Department of History

Diversity has been the top priority for educational institutions since Brown v. Board of Education established that everyone, no matter the color of their skin should have access to equal education. One concept that set out to make educational institutions, including law schools more diverse is Affirmative Action. Introduced in 1961 by President Kennedy, affirmative action tried to ensure that everyone has an equal opportunity in education and the job market. Yet law schools are not diverse. While law school admission offices claim that they are diverse and they use affirmative action to try to alleviate systematic exclusion of minorities, the data shows that is not the case. Law schools should be diverse because they produce lawyers. Law schools should include more people of color to reflect the public. When law schools are not diverse, then the lawyer profession is not diverse. When the law profession is not diverse, it leads to an unjust criminal justice system. Affirmative Action sought to recognize historical inequalities based on race, yet there was seemingly no recognition of how diversity in education would be necessary to accomplish these goals. In light of the philosophical writings specifically *The Souls of Black Folk* by Web DuBois and *Equality: selected readings*, I have written about equality and the value of education. I also write about court cases that specifically deal with affirmative action. The courts have determined that it is constitutional when affirmative action is used to create diversity as long as they are not used to create quotas. I have also examined the data that reflects that law schools are not diverse. By the end of this paper, the reader will know the answer to the question as to why law schools are not diverse.

Mathematics

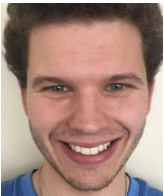


CAN MATHEMATICS HELP END THE SCOURGE OF POLITICAL GERRYMANDERING?

Austin Fry (Dr. David Gerberry)

Department of Mathematics

In recent years, Americans have become engrossed in politics. Unfortunately, the positive effect of having an engaged, informed electorate has been offset by the fact that political beliefs have become more polarized than ever. One of the main contributors to this polarization is the process of political gerrymandering where voting districts are drawn to favor a given political party. This leads to elected officials that are not representative of the political beliefs of a region and a larger number of noncompetitive voting districts. This lack of competition ultimately produces elected officials that are less willing to compromise. In this research, we use a genetic algorithm approach to attack the Ohio Redistricting Competition created in 2009 to redraw Ohio Congressional districts. The competition rules judge the quality of a districting plan by 4 categories: compactness, communities of interest, competitiveness and representational fairness. Compactness assures bizarrely shaped legislature districts are minimized. Communities of interest give sense of place and shared interests among residents. Competitiveness allows the marketplace of ideas to be competitive and parties with a stronger voice choose their representatives. Representational fairness counterbalances competitiveness to assure a final redistricting plan does not unfairly bias one party over another. We have found that our genetic algorithm provides a particularly flexible framework for addressing the issue of political gerrymandering.



THE EFFECT OF THE INCIDENCE FUNCTION ON THE EXISTENCE OF BACKWARD BIFURCATION

Drew Philip (Dr. David Gerberry)

Department of Mathematics

In modeling the dynamics of infectious disease, the choice of the specific mathematical formulation of disease transmission (i.e. the incidence function) is one of the initial assumptions to be made. While inconsequential in many situations, we show that the incidence function can have an effect on the existence of backward bifurcation (the phenomenon where a disease can persist even when the basic reproductive number is less than 1). More specifically, we compare mass action and standard incidence (the most common incidence functions) versions of two hallmark models in the backward bifurcation literature and an original combination model. Our findings indicate that the standard incidence formation of disease transmission is more conducive to backward bifurcation than mass action, a trend seen in all the models analyzed.

A MATHEMATICAL MODEL FOR THE EPIDEMIOLOGY OF YELLOW FEVER

Mary Moesta (Dr. David Gerberry)

Department of Mathematics

While yellow fever poses a small threat to the United States, it still takes the lives of tens of thousands in several African countries. We investigated the path of yellow fever as it moves from human to mosquito and back again using a differential equations-based SIR model. This presentation breaks down the working parts of the model and dives into both simulations and implications of the model. Conclusions based on the findings are discussed and how they apply to the current state of the yellow fever vaccine and vaccination rates themselves.



POLITICAL OPINION AND SOCIAL MEDIA: A MATHEMATICAL MODEL

Kaitlin Bruegge (Dr. David Gerberry)

Department of Mathematics

Coexistence of differing political ideologies is a hallmark of American democracy dating back to the battles of Jefferson and Hamilton. Nevertheless, recent politics has become even more contentious. How did we get to a place where government is ineffectual because participants refuse to compromise? Has social media played a role in this change? These are the questions I hoped to explore with this project. Using a system of ODEs representing an ideological spectrum, I examined how the opinions of a population change over time, with exposure to stances affirming and opposing their own.



THE EFFECTS OF CHILD HEALTH ON REMITTANCE LEVELS: EVIDENCE OF THE LATIN AMERICAN REGION

Easton Mohn (Dr. Aimee Schwab-Mccoy)

Department of Mathematics

This paper is looking at the economic impact that child health, and other key economic variables, have on the remittance levels in the Latin American region from 2000 to 2015. This paper contains the ideal data set and ideal regression to analysis the results. The expected results show us that child health, along with other key economic variables; help explain the remittance levels in Latin American countries.

Philosophy

WHAT IF AMERICA WAS AMERICA?

Jeremiah Pennebaker (Dr. Timothy Brownlee)

Department of Philosophy

This thesis explores the philosophical foundations of America through the lens of Lockean philosophy, and attempts to highlight the hypocrisy and deception that exists in both John Locke and the foundation of America. Focusing primarily on the writings of John Locke, Charles Mills, and Ta-Nehisi Coates this thesis shows how the ideation of both Locke's social contract and the American narrative are vastly different than in practice. It focuses specifically on Black Americans and property rights. What was meant for freedom and equality has been used to justify violence, oppression, and theft. Ultimately this thesis will show that John Locke short sighted his own account in his Second Treatise and by extension America continues to fail at actualizing what is written in its founding due to White supremacy. Yet, there if White supremacy is removed from the context of American society then for once America will be great.

Philosophy, Politics, and the Public

THE SALVADORIAN REVOLUTION: FEMINIZATION OF INTERNATIONAL ADVOCACY AGAINST U.S. MILITARY AID, 1970-1992 AND TODAY

Alison Trianfo (Dr. Julia O'Hara, Dr. Timothy Brownlee, Dr. Michelle Brady)

Department of Philosophy, Politics, and the Public; International Studies

Situated on the western coast of Central America along the Pacific Ocean, El Salvador's small, six million-strong population is one of the smallest countries in the region with one of the most tremulous histories. Ruled by a military dictatorship guised as a democratic and capitalistic regime for much of the mid twentieth century during the Red Scare in the West, El Salvador's government established close ties with the United States when Ronald Reagan took office in 1981. Fighting against an insurgency considered to be a lurking anti-democratic and communist movement, the Salvadoran government lobbied the Reagan Administration for military aid in the form weapons and monetary assistance to stamp out communism in the country. As advocates for the disappeared and outspoken anti-violence protestors, women became the targets of physical and sexual assault by the National Army in the streets, prisons, and military posts throughout El Salvador. Mothers actively looking for disappeared children, mostly older teenagers and young adults who were the base of student protests in the 1970s, formed the Committee of Mothers and Relatives of the Political Prisoners, Disappeared, and Assassinated in El Salvador (COMADRES) dedicated to finding their loved ones and uniting to protest

government-sanctioned war crimes. In attempts to undermine the growing influence of the COMADRES, rape and torture became a tool of interrogation, intimidation, and subjugation by the military, which despite public outcry and international condemnation continued to be funded by U.S. foreign aid. As international attention to the COMADRES grew, their activism set the stage for shaping women's and mother's activist groups across Latin America and the United States.



BREWING SOCIAL CHANGE: HOW COFFEE CAN SERVE AS A CATALYST FOR AN EQUITABLE GLOBAL FOOD SYSTEM

Andrew Hermann (Mr. Braden Trauth)

Department of Philosophy, Politics, and the Public; Land, Farming and the Community

Using coffee production and personal experiences in the Dominican Republic as a proxy to uncover a greater interconnected global food crisis, this thesis claims that food is the foundation of society, and we must respect and refocus efforts to creating a clean and just food supply that will secure a stable and equitable future. A case for perennial based, carbon farming is the only pathway forward for the 21 million small-scale coffee farmers in the world. Food sovereignty, or the right to grow and produce one's own food, is the gateway to energy and political sovereignty, thus creating innumerable co-benefits as the community transitions to the stated form of regenerative agriculture. The road map is rooted in years of experience in the classroom and on the farm with a particular focus on how collaboration and partnership can yield strong relationships and build community.



POLITICAL CYNICISM. THE CAUSES AND AFFECTS

Andrew Redd (Dr. Mack Mariani)

Department of Philosophy, Politics, and the Public; Political Science

Over the course of six years there has been a growth of negativity towards the government, known as political cynicism. Unlike historically and based in political philosophy, this negativity is not rooted in economics, but rather based in other means. This paper is going to examine a source of the increase in political cynicism, negative advertisements from Super-PACs established by the Supreme Court decision, Citizen's United v. Federal Election Commission, and measure the potential affects, voter turnout.



THE INCLUSIVITY OF THE PUBLIC SPHERE

Charla Henderson (Dr. Kyra Shahid)

Department of Philosophy, Politics, and the Public; Political Science

This work explores what the U.S government and the public sphere has defined as public goods and how they are distributed. One of the primary goods explored is the nuclear family and its ability to be a package of several goods that are crucial to the establishment of the American Dream. After analyzing the components of the nuclear family as the following commodified goods; stable home, adequate education, and a living wage, I analyzed how these goods were denied to the Black community. Each good has been systematically denied to Black Americans, making the nuclear family and the American Dream institutional unattainable. In conclusion, it is established that the Black community must not be accepted into the American public sphere because they are repeatedly denied to the public good it provides.



THE EFFECTIVENESS OF WORKFORCE TRAINING PROGRAMS AT INCREASING PARTICIPANT WAGES

Connor Lang (Dr. Clay McManus and Dr. Timothy Brownlee)

Department of Philosophy, Politics, and the Public

The following paper examines whether workforce-training programs can effectively raise the wages of participants. An econometric model is presented that can be utilized to analyze the effectiveness of the programs. If the programs are found to be effective, government resources should be spent to increase funding for workforce-training programs to efficiently combat poverty. After the economic analysis, a second section is presented that examines the philosophical possibility that training could raise wages. The works of Adam Smith and Karl Marx are analyzed to show two contrasting beliefs on the possibility of wage increases from training. Finally, the implications of Marx's position are analyzed in the context of Abraham Lincoln's writings and Habermas's works.



OVER CRIMINALIZATION AND THE NEW JUSTICE SYSTEM

James Hogan (Dr. Steven Paul O'Hara)

Department of Philosophy, Politics, and the Public; Political Science

The conception of our judiciary is rooted in the ideal that no government entity should hold enough power to over-ride our natural rights. The founding fathers fought to ensure that the federal government was not so powerful that all three branches could monopolize power or dominate, let alone one branch having such power. However, in modernity the American judiciary is a tyrant that gives prosecutors the tools and incentives to criminalize innocent behavior for their own gain. This writing explores the modern American legal code, the prosecutors who abuse it, and court cases that highlight the degradation of American Justice. The goal of this work is to persuade us all to be wary of our judiciary and recognize the faults in the way that it currently operates and the ways in which we perceive it and its members successes.



FREE MONEY: HOW DISTRUST SEVERED GOVERNMENT'S ROLE IN BANKING AND WHY THE CIVIL WAR REUNITED IT

Kevin Mulcrone (Dr. Steven Paul O'Hara)

Department of Philosophy, Politics, and the Public; Economics

The presidential election of 1832 revolved around a single issue: The Second Bank of the United States. Over its 15 year existence, the bank had developed into a symbol of the perceived cronyism between the country's aristocratic class and the federal government. By vetoing the national bank's charter for renewal four months before the election, Andrew Jackson's landslide victory over Henry Clay signaled citizens' growing distrust of the power held by the federal government and the behemoth bank it created to manage its deposits. With the Second Bank of the United States dismantled, state-chartered and privately owned banks proliferated and the banking industry became subjected to the same market forces all industries operated under. This thesis provides a brief history of banking in the early republic in order to understand how the Second Bank of the United States came about. It then deconstructs and examines how the free banking system operated and how it altered the relationship between the federal government and its citizens. Finally, it uses John Locke's arguments for why individuals decide to abandon the liberty-maximizing state of nature and form civil society to explain why citizens allowed the federal government to take control of banking again during the Civil War.



POPULISM IN NORTH DAKOTA AND THE NONPARTISAN LEAGUE

Steven Leesman (Dr. Frank Rzeczkowski)

Department of Philosophy, Politics, and the Public; History

The Populist movement that swept through the nation during the late nineteenth century has often been seen by the public as an agrarian revolt against the preexisting political establishment that had few lasting consequences. This popular narrative is challenged, however, by the success of the Nonpartisan League in North Dakota. Often the territory that would become North Dakota is often overlooked in studies on the Populist movement given its relatively recent induction as a state in 1889, which lies near the end of Populist era. Yet between 1916 to 1920, the Nonpartisan League instituted several distinctly populist policies that had otherwise failed to be passed during the high tide of the populist movement during the previous decades. These accomplishments include North Dakota Mill and Elevator, the only state-owned mill in the nation, as well

as the Bank of North Dakota, the only state-owned bank. I argue, along with modern scholarship, that North Dakota had been steeped in the Populist tradition as seen in the North Dakota constitution which included several clauses influenced by Populist policy. When examined from this frame, I contend that the Nonpartisan League can be seen as a continuation of a preexisting Populist movement in North Dakota.



AESTHETIC PHILOSOPHY AND AMERICAN MODERNISM: A STUDY THROUGH THE WORK OF ROBERT HENRI, THERESA BERNSTEIN, AND ISABEL BISHOP

Shannon Price (Dr. Suzanne Chouteau, Dr. Timothy Quinn)

Department of Art & Philosophy, Politics, and the Public

American modernism is an art movement often overshadowed by its European counterpart. When the movement is discussed, male artists such as Robert Henri, John Sloan, George Bellows, and Edward Hopper dominate the narrative. This essay explores the contributions of two women modernists, Theresa Bernstein and Isabel Bishop, in light of both the Kantian aesthetic philosophy that underlies European and American modernism and the interpretation of that philosophy by Robert Henri and his Ashcan School (who were contemporaries of Bernstein and Bishop). The careers and many successes of the women American modernists studied in this paper have been chronicled before, but are mostly discussed—as women in art history often are—as individual outliers who managed to function in an otherwise male-dominated discipline. This paper represents an effort to examine the work and artistic philosophies of these women modernists in the context of a larger narrative, a movement that they participated in and expanded on at the same level as better known artists like Henri, Sloan, Bellows, and Hopper. A better understanding of Bernstein and Bishop in context of their peers and the aesthetic philosophy of their time contributes not only to the appreciation of their work but also to the diverse legacy of American modernism.

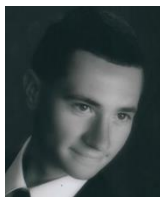


EFFECT OF INTERNATIONAL LABOR STANDARDS ON HUMAN CAPITAL ACCUMULATION WITH RESPECT TO CHILD LABOR PRACTICES IN MEXICO

Ben Moore (Dr. Hasan Faruq, Dr. Michelle Brady)

Department of Philosophy, Politics, and the Public; Economics

Article 123 of the United Mexican States Constitution ratified in 1917 forbids the use of child labor under the age of fourteen. However, one hundred years later Mexico has yet to find a way to effectively protect and promote the social rights of children. According to the National Institute of Statistics and Geography (INEGI), more than three million minors participated in the labor force in 2011. Many of the three million minors in the labor force are subject to unsuitable working conditions. Decades of isolationist trade policy contributed to a structural dependence on child labor in the Mexican economy. However, in 1994 Mexico branched out into the global economy as a partner in NAFTA. In addition to NAFTA, the partner countries agreed to the North American Agreement on Labor Cooperation (NAALC). The NAALC outlined a set of labor standards that each country was obligated to follow and it went into effect in conjunction with NAFTA. The significance of the NAALC lies in the fact that the agreement tethered Mexico to a set of international labor standards for the first time in its history. Among the labor standards outlined in the NAALC is the prohibition of child labor. Therefore, the agreement established a level of transparency between the three economies and forced Mexico to take an honest look at labor practices across the country and actively pursue an end to child labor. Using census data from 1990 and 2000, this paper examines the effect of the NAALC on illiteracy rates among males and females 5-14 in Northern and Southern Mexico. This paper seeks to determine the extent to which international labor standards effect human capital accumulation, and contribute to the discussion surrounding labor practices in the global economy.



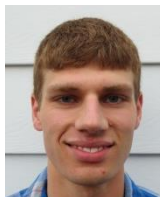
POLITICAL POLLING MANIPULATING VOTER ATTITUDES

John McKinley III (Dr. Steven Frankel, Dr. Christian End)

Department of Philosophy, Politics, and the Public; Psychology

Public political polling has been an important component to the political campaign process for both voters and candidates since the early twentieth century. Campaign managers have wanted to know exactly what effect polling has on voters so that they can use polling effectively in campaign strategy. This study should be an aid to in how to use data in a campaign more effectively. In this study, participants were shown one of three Ohio state polls with either President-elect Trump leading, Secretary Clinton leading, or a tied race between the two. All participants also viewed a graph containing the aggregate polling data for Ohio. Statistically significant results positively correlated that public political polling affects voters' willingness to vote, enthusiasm for the campaign, and concern for the candidate. However, it was determined that political polling was not a persuasive strategy to change voters' minds on who they were voting for. There was also a high degree of reported trust of the polls shown to the voters especially if the results coincided with how the participant thought Ohio would vote. The results of the study led to a philosophical exploration of the question "Does a Democracy require its citizens to make rational choices?"

Physics



EXAMINING GALAXY GROWTH RATES ARISING FROM COMPUTER-BASED SIMULATIONS

Andrew Bryan (Dr. Marco Fatuzzo)

Department of Physics

The way in which galaxies formed throughout the evolution of the universe is still an unknown process. Based on the Λ -CDM model, a model that describes multiple properties of the cosmos, cosmologists have hypothesized merging as a possible account. Cases for merging processes have resulted in multiple numerical models to be developed that detail galaxy growth. For this particular research, two of these models yielding different outcomes were studied. Deep redshift observations recently performed on galaxies of two different epochs have enabled the testing of the two models to help more precisely determine how galaxies have evolved.



OBSERVING UNFOLDING OF WILD-TYPE AND VARIOUS MUTANT FORMS OF CYTOCHROME C TO TEST FOLDON THEORY

Brennan Cull (Dr. Justin Link)

Department of Physics

Numerous studies have been completed trying to improve the understanding of protein folding. For fifty years, no one has been able to understand why proteins fold the way they do and this study was attempting to help uncover this mystery. Using a 33-step titration process wherein horse heart cytochrome c was unfolded using the denaturant, guanidine hydrochloride (GdnHCl), and then scanned with three different spectroscopic techniques: fluorescence, absorbance, and circular dichroism (CD). The data obtained from these scans allowed for analysis of the protein unfolding using a fitted line equation to calculate Gibbs free energy and concentration of guanidine hydrochloride at the midpoint. The results were compared to a proposed sequence that cytochrome c was supposed to unfold and found that the sequence was almost reversed. It seems that possibly moving the tryptophan around in cytochrome c changed the composition of the secondary structure which can lead to differing thermodynamic values from those determined from a single version of the protein using hydrogen-deuterium exchange. Further research will have to be done analyzing the secondary structure composition of the various versions of cytochrome c.



HEAT-INDUCED FOLDING AND UNFOLDING OF A COPPER-CONTAINING AMINE OXIDASE FROM *HANSENULA POLYMORPHA* USING CIRCULAR DICHROISM SPECTROSCOPY

David Ritzenthaler (Dr. Justin Link, Dr. Stephen Mills)

Department of Physics

Protein folding is largely influenced by the nature of the surrounding environment. An increase in temperature can generate enough energy to cause a protein to change conformation, and even unfold. Thus, this experiment was designed in order to come to a better understanding of how proteins behave at high temperatures. Due to its size, it is proposed that copper-containing amine oxidase from *Hansenula polymorpha* (HPAO) is unlikely to return to its native state upon refolding. This group used Circular Dichroism (CD) spectroscopy to infer the secondary structure of HPAO at intervals during heat-induced unfolding followed by refolding during cooling. Qualitatively analyzing the CD spectra revealed a signal change around 60 °C during unfolding, which suggests a change in the conformation of the protein at that temperature. The reverse change was not seen in the CD spectra of the refolding process, implying the occurrence of an irreversible change in the protein's secondary structure. As well, it can be concluded that, after the unfolding and refolding processes, the protein exists in a higher energy state than before the experiment was conducted.



CONSTRUCTING A FORMULA FOR A WAVEFRONT THROUGH A LENS

Steven Reichman (Dr. Heidrun Schmitzer)

Department of Physics

As light propagates through space, we can measure the shape of the wave, or the wavefront. This is measured with a Shack-Hartmann wavefront sensor. When a beam of light is focused through a lens, this shape becomes parabolic. As the wavefront approaches the focal point, the steepness of this paraboloid increases towards infinity. Once it crosses the focal point, the paraboloid changes direction, and starts to flatten out again. By plotting this change in curvature, a formula can be constructed that relates the distance from the lens to the lens' properties including its focal length, shape, and index of refraction. This formula has not been constructed before, but it can be used to test the material a lens is made from. It also leads to an interesting idea that the light beam has a "memory" of what kind of lens it has travelled through.



USING A RASPBERRY PI TO EXPAND EXPERIMENTAL CONDITIONS FOR A LIGHT SENSING PROTEIN

Derek Burdick (Dr. Justin Link)

Department of Physics

Cryptochrome is a light and magnetic field sensitive protein that has many functions throughout the plant and animal kingdoms. It has been linked to many plant growth factors, bird migration, and human sleep cycles. By bettering our understanding of this protein, science will gain insight into all of these biological processes allowing for advancements in responses to problems in these areas. In order to better understand this protein, experiments involving lights and magnetic fields need to be designed so protein functionality can be tracked under varying conditions. The problem with this is that there is no reliable and feasible way to conduct experiments for long time scales (weeks) and short time scales (milliseconds) for pulsing lights, long light and dark periods, pulsing magnetic fields, and long periods of magnetic fields. A raspberry pi device has been modified to be used for this purpose and has been programmed to control up to three electronic devices, any combination of high power LEDs and Helmholtz coils, at both long and short time scales as desired.



HOW NON-PARALLEL SIDES (WEDGE) IN AN OPTICAL FLAT AFFECTS INDEX OF REFRACTION MEASUREMENTS IN THE SAGNAC INTERFEROMETER

Brittany Berry (Dr. Heidrun Schmitzer)

Department of Physics

Gradient Index (GRIN) materials are used in photocopiers, printers, optical fibers, and imaging systems; furthermore, they can help reduce the cost, weight, and image clarity of such systems. To understand these materials better, the (homogeneous) index of refraction of the glasses and/or polymers used to make these GRIN materials is very important. The index of these base materials is measured in a Sagnac interferometer. This system can experience error if the optical flats used to measure the index of refraction do not have perfect parallel sides (wedge), as this affects the thickness of the sample. This error can be further compounded if the sample is not in the center of the Sagnac's cavity. This research aimed to examine how much error wedge can cause, and if the center of the system can be found. The results found that a one-centimeter shift away from the center had large effects on the measured index of refraction; furthermore, the expected center of the system resulted in an error of the accepted index of refraction value of the test sample within the generally accepted accuracy of the Sagnac interferometer.



SENSORY NEURON GDNF FAMILY RECEPTOR ALPHA-1 MODULATES MUSCLE NOCICEPTION AFTER ISCHEMIA WITH REPERFUSION INJURY

Evan Purvis (Dr. Justin Link)

Department of Physics

Muscle pain is a chief complaint among patients experiencing chronic pain with several potential causes, one of which is ischemia. Ischemia is a reduction or loss of the oxygen supply to cells by a reduced or eliminated blood flow to the specified tissue. The mechanism of ischemic induced muscle pain has not been fully understood, but it has direct involvement in diseases such as peripheral vascular disease, fibromyalgia, and sickle cell anemia. Due to the association of ischemic muscle related neurons with the regulation of pain and a link between glial-line cell derived neurotrophic factor (GDNF) and pain development, we sought to determine if the increased production of GDNF receptor protein (GFR α 1) was responsible for the development of the pain-related behaviors and the elevated blood pressure in mice after 6 hr of induced ischemic injury and 18 hr of recovery from the injury (I/R). We were able to successfully prevent the increased production of GFR α 1 through the use of an siRNA knockdown strategy resulting in significant reduction or prevention of specific pain-related behaviors in the mice with I/R. The GFR α 1 selective knockdown strategy also prevented the increased production of other specific membrane proteins. These results provide support for the role of the increased production of GFR α 1 in the development of nociception and cardiovascular responses due to ischemic conditions and a proposed mechanism.

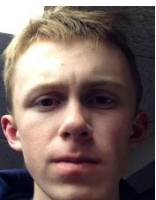
Political Science

EXECUTIVE POWER AND ECONOMIC TRENDS

Christopher Dimitriou (Dr. Mack Mariani)

Department of Political Science

The United States executive displays unilateral power through the means of executive orders. I hypothesize that the president's reliance on executive orders is more prevalent during presidential terms in which the economic condition is either unstable or in relatively poor shape, compared to presidential terms characterized by growth and economic stability. In this project, I compare presidents during the 20th and 21st century to assess whether the use of executive orders is influenced by economic trends, as measured by adjusted real GDP, real unemployment rate, and average income. The status of the house and senate control, as well as the occurrence of wars are controlled for when examining the relationship.



POVERTY, CULTURAL DILUTION AND NATIVIST RHETORIC IN THE UNITED STATES

Connor Lahey (Dr. Mack Mariani)

Department of Political Science

Throughout U.S. history, nativists and immigration supporters have struggled over possession of our nation's soul. The instinctive hatred of the other, the outsider, has always been at extreme odds with that high minded idealism which demands that we treat our neighbor, no matter his race, creed or color, as an individual deserving of equal justice under the law. While nativists argue that their support of strict immigration policies is based on economic concerns, many scholars argue that nativism is predicated on racism and xenophobic fears that immigrants will dilute the prevailing culture. In order to come to an adequate understanding of whether both, one or neither of these causes are at the root of recurring nativist trends within the United States, I examine the relationship between nativist rhetoric, as expressed in Presidential State of the Union Addresses and economic conditions. I hypothesize that nativist SOTU surges during periods of economic distress as measured by poverty rates.



STANDARDIZED TEST SCORES & SCHOOL FUNDING IN ILLINOIS

Kacee Thompson (Dr. Mack Mariani)

Department of Political Science

Looking at how well schools in the state of Illinois do on their standardized tests and how much funding they receive has been a question to be looked at. Not just at one state but at all states, this project simply looking at Illinois'. There is a problem in our education system that shows most schools with lower amounts of funding tend to do score more poorly than those schools that receive more funding. To look at this problem, I have found report cards from the state of Illinois that looks at the scores of schools standardized tests, I also have looked at the amounts of funding each school and district in Illinois receive and where it gets put. This far into my research, I have found that the more funding schools put towards testing, tend to have higher test scores, but I have also taken into consideration the variables that may also play a role in the test scores: race, poverty, and if they are private or public schools. I believe that this study will help find ways to get under-funded schools higher test scores.



SENATOR LOCATION AND NATIONAL PARKS FUNDING

Mary Timmons (Dr. Mack Mariani)

Department of Political Science

Previous research indicates that Republicans are less likely to support funding for the National Parks than Democrats. In this article, I examine the impact of regional differences within the parties on levels of support for National Parks funding. Because western states have been more reliant on federal funding for parks and natural resources management, I hypothesize that Republican members of the Senate from the West are more likely than Republican Members of Senate from other regions to support National Parks funding. In this study, I examine the impact of party, region, gender, years of service, and the percentage of federal land in a state on U.S. Senators rankings on a National Parks scorecard compiled by the League of Conservation Voters and the National Parks Action Fund. Understanding legislators' support for the National Parks requires us to go beyond party to consider the impact of region and other variables. This research may help researchers better understand the effects of earmarking and constituent influence on Senates votes.

IMMIGRATION & CRIME: WHAT'S THE REAL STORY?

Ethan Schuld (Dr. Mack Mariani)

Department of Political Science

The relationship between immigration and crime is a frequent subject of debate. With the world trending increasingly towards a nationalist, protectionist ideology, some world leaders and a number of candidates for national office, have argued that there is a positive relationship between increased rates of immigration and higher rates of crime. This project will utilize United Nations data on migration and national-level crime data from the United Nations Office on Drugs and Crime to assess the relationship between immigration and crime, while controlling for immigration policies, "immigration friendliness," economic conditions and religious tolerance. In this study, I will test the hypothesis that countries with higher stocks of immigrants will see higher rates of crime.

IMMIGRATION AND CRIME AT A STATE LEVEL

Stephen Walker (Dr. Mack Mariani)

Department of Political Science

The purpose of this research is to examine at a state level the effect of immigration of the crime rate of a state. Generally, other research as supported the conclusion that as immigration increases, the overall violent crime of a state will decline, which is what this research is hoping to prove as well. The data I analyzed was the U.S. census data from 2000 as well as the FBI's Uniform Crime Reporting data from 2000 in order to evaluate the total number of immigrants in a state as well as the violent crime rates of the states. The hypothesis that is being asserted is that as immigration increases, the violent crime rate of states will fall. The potential significance of this study is that it will provide evidence that can be used to support a plan of action or policy agenda that could be put forth at a national or state level, as well as shed light on the actual danger that is present in immigration versus danger that is perceived by the public or media.

GENTRIFICATION AND PUBLIC POLICY

Aaron Rance (Dr. Mack Mariani)

Department of Political Science

One of the goals of gentrification is to help improve the lives of the poor by targeting public and private investment to impoverished or underdeveloped parts of major urban cities. Though many studies have examined the impact of gentrification on the local economy, business growth and crime rates, few researchers have examined the impact of gentrification on the political agendas of local elected officials. I hypothesize that following a major gentrification project, a city council will be less likely to introduce and pass ordinances aimed at helping low income populations than before that gentrification project began. This study will focus initially on the case of Cincinnati, Ohio, by comparing the share of proposed and approved city council ordinances aimed at helping low-income residents before and after the gentrification of Over-the-Rhine (OTR).

IMMIGRATION AND UNEMPLOYMENT IN THE UNITED STATES

Tony Pereira (Dr. Mack Mariani)

Department of Political Science

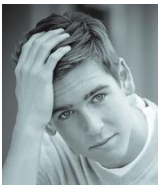
The immigration debate and its effect on the economy has been the subject for an on going debate. Using data from Migration Policy Institute and Bureau of Labor Statistics, I examine the relationship between how many immigrants each state gained in 2015 and the unemployment rate. I hypothesize that the more immigrants a state has, the lower the unemployment rate. Thus I argue that immigration a positive effect on the United States economy.

EFFECTS OF GOVERNMENT EXPENDITURES ON ECONOMY

Grayson Jenkins (Dr. Mack Mariani)

Department of Political Science

This study is meant to answer the question of whether or not more government spending is beneficial to economies, especially in times of recession. Using statistics from CQ Press Library, expenditure values and unemployment rates (among other statistics) were obtained. In order to test the effects of government spending on the economy, all U.S State government expenditures were compared to unemployment rates in the respective state. Statistics from fiscal year 2005 thru fiscal year 2014 were used to answer this question. By comparing these two statistics specifically, the economy was measured as well as the ideology of the government in getting through the recession. To accommodate for the vast differences in budget and populating, the total expenditures of each state government were analyzed on a per capita basis. I hypothesize that states that spend less money per capita in government expenditures will not thrive in recession periods.





RELIGIOUS IDENTITY, SOCIAL IDENTITY, AND SUPPORT OF VIOLENCE

Zachary Moeller (Dr. Mack Mariani)

Department of Political Science

Much of the literature surrounding religion and political violence began with Huntington's "clash of civilizations" thesis which suggests that Christians and Muslim interactions are likely to result in violence. Other theories, however, argue that religious values – Muslim as well as Christian, contribute to peaceful resolutions of conflicts and dialogue, tolerance, and cooperation on the political level. In this study, I utilize data from the Tolerance and Tension study from the Pew Research Forum, and juxtapose the nuanced psychological factors with studies from Daphna Canetti and Christine Fair, who both voice alternative theories on resource loss and doctrine. This goes to examine whether Christianity and Islam are truly on an inherent collision course. I also control for several other variables that may be linked positively or negatively to protest and political violence, including relative deprivation, resource loss and mortality salience. I hypothesize that religious identity is not the dominant actor in political violence, nor are Christianity and Islam inherently incompatible.



ANALYZING THE DISPARITY BETWEEN PUBLIC OPINION AND ACTUAL ECONOMIC CONDITIONS IN REGARDS TO SPECIFIC PRESIDENCIES

Christopher Nuelle (Dr. Mack Mariani)

Department of Political Science

Republican presidents historically focus on more conservative fiscal policies, which often entail tax cuts and limiting government spending. Democratic presidents historically focus on more liberal fiscal policies, which usually entails increased government spending and other spending-heavy policies. Public opinion polls are influenced by how economic policies directly influence citizens, and Democratic policies are often perceived more positively by the public than Republican policies, regardless of the state of the overall economy. Using data on voters' perceptions about the state of the economy from the American National Election Survey, tax and spending data from the Office of Management and Budget, and economic data from the Bureau of Labor Statistics and the Bureau of Economic Analysis, I will examine the relationship between presidential approval and the state of the economy, when controlling for taxes and spending. I hypothesize that in a comparison of presidencies, strong GDP growth and low unemployment in the previous year will be more strongly associated with high-levels of public approval for Democratic presidents than Republican presidents.

Psychology



THE ROLE OF STIGMA: THE EFFECT OF MENTAL DISORDERS ON THE LIKELIHOOD OF RECIDIVISM

Alex Rake (Dr. Cynthia Dulaney)

Department of Psychology

In general, criminal defendants are not highly regarded. When these defendants are labeled with a mental illness, there tends to be an even greater stigma toward these individuals (Wierson & Forehand, 1995). This study examined perceptions of criminal defendants identified with a mental disorder and their likelihood of recidivating. A sample of 84 undergraduates reviewed a summary depicting a criminal defendant and read a short mock trial transcript from the testimony of a psychiatrist. The defendant was identified as having no mental disorder, a violently stigmatized mental disorder (schizophrenia), or a non-violently stigmatized mental disorder (depression). Participants then rated their perceptions of mentally ill defendants. There was no difference between the mental status of the defendant with relation to the perceptions of the defendant's likelihood of recidivating, $F(2,81) = 1.92, p = .15$. However, there was a difference between the mental status of the defendant with relation to overall impressions of the defendant, $F(2, 81) = 3.26, p = .04$. This difference was due to the greater negative impression of defendants with a violently stigmatized mental disorder than of defendants with no mental disorder. Despite no difference in the perception of recidivism of defendants with a mental illness, there was still an overall negative impression of individuals with a violently stigmatized mental disorder indicating that future actions are needed to address the stigmatization of mental disorders within the criminal justice system.

ANYTHING THEY CAN DO WE CAN DO BETTER: THE EFFECTS OF RACE ON THE PERCEIVED LIKELIHOOD OF SUCCESS BETWEEN PEERS

Arielle Lewis(Dr. Cynthia Dulaney)

Department of Psychology

Research on job and academic performance has shown that authority figures tend to rate White employees and students better than their Black peers (Kraiger & Ford, 1985; Waldman & Avolio, 1991; Dandy, Durkin, Barber & Houghton, 2015). This pattern has also been found in student and employee self-evaluations (Dandy et al., 2015; Pulakos, White, Oppler & Boreman, 1989); although, others have refuted this evidence (Pulakos, White, Oppler & Boreman, 1989). The present study extended this research by examining whether race effects are present from a peer perspective. In addition, the relationship between Academic Self-Concept and the internalization of White stereotypes was evaluated. 42 White students and 26 students of color (SOC) completed the Academic Self-Concept Scale (Reynolds, Ramirez, Magrina, & Allen, 1980) then viewed a mock medical school interview and completed the Interviewers Evaluation of Applicant Performance Measure (Latu & Mast, 2016) for the applicant in the video. Afterwards, the participants completed the Applicant's Self Evaluation Measure (Latu & Mast, 2016), from the perspective of the applicant, and the Nadanalization Scale (Taylor & Grundy, 1996) to measure how strongly they internalized White stereotypes. The results revealed a main effect for the race of the applicant in the mock medical school interview video, $F(1, 63) = 4.90, p = .03$; surprisingly, the Black applicant was rated higher overall by their peers than the White applicant. In addition, there was not a significant relationship between student Academic Self-Concept scores and the internalization of White stereotypes $r(65) = -.16, p = .19$. There were also no significant differences in the Academic Self-Concept scores between both groups, $t(65) = 1.71, p = .09$. The conflicting findings in this area of research suggest there may be an additional component that remains unaccounted for in understanding how race influences performance evaluations.



THE EFFECTS OF INSTAGRAM CONTENT ON THE PERCEIVED NARCISSISM OF MILLENNIALS

Celeste Carlson (Dr. Tammy Sonnentag)

Department of Psychology

Recent increases in the prevalence of social networking sites (SNSs) paired with the growing perception that millennials are narcissistic has raised the question whether there is an association between SNSs and millennials' level of narcissism. Given the growing stigmatization of millennials as narcissistic, the present study examined whether age of an Instagram user and the content of photograph posted on Instagram influenced their perceived level of narcissism. One hundred and eight female undergraduate students ($M = 19.76, sd = 1.14$) participated in the study. Participants were randomly assigned to one of four conditions, where they viewed 10- or 50-year old Instagram user post either selfies or portraits of their Instagram profile. Participants then completed a packed of questionnaires assessing their perceptions of the Instagram user's narcissism. Instagram users who posted selfies were perceived as significantly more narcissistic than Instagram users who posted portraits. Younger Instagram users were not found to be perceived as more narcissistic than older individuals. However, younger Instagram users who posted selfies were perceived to be as more narcissistic than older Instagram users who posted selfies. No significant difference emerged in the perceived narcissism of younger or older Instagram users who posted portraits on Instagram.

Keywords: social networking sites, narcissism, millennials, age, content.



HOW DO COLLEGE STUDENTS PERCEIVE MALADAPTIVE WAYS OF COPING WITH STRESS? EXAMINING PERCEPTIONS OF ALCOHOL USE, EXCESSIVE EXERCISING, AND DISORDERED EATING

Elizabeth Hartsock (Dr. Dalia Diab)

Department of Psychology

Disordered eating and heavy alcohol usage tend to be common issues among college students, especially those who are experiencing stress. In fact, research has shown that the rate of binge drinking is significantly higher in those already displaying symptoms of disordered eating (Rush, Curry, & Looney, 2016). Another area that may not be commonly seen as problematic but which can become extremely harmful is excessive exercising. The purpose of this study is to investigate if college students perceive maladaptive behaviors as effective strategies to deal with stress, and if they perceive one strategy as more effective than another. Specifically, this study examined if students' perceptions differed among the following dysfunctional behaviors: alcohol usage, disordered eating, and excessive exercising. Participants were assigned to one of three vignettes describing a situation in which a hypothetical student was coping with academic stress by using one of those three behaviors. Then, they were asked to complete a survey rating how effective they thought those strategies were to cope with stress. Findings from this study can help university officials gain a better understanding of how college students perceive maladaptive coping strategies.



SEVERITY OF PHYSICAL ABUSE: DECISIONS ABOUT PLACING A CHILD INTO FOSTER CARE

Kaila Latina (Dr. Tammy Sonnentag)

Department of Psychology

Researchers and Child Welfare Services (CWS) have studied what constitutes the removal of a child from their primary home into foster care. In a study examining the effect of severity of physical abuse on the decision to place a child into foster care, and the permanency of the foster care placement, 120 students from Xavier University were recruited. Participants were asked to read one of the four fictional case files describing allegations of mild, moderate, or severe child abuse, or a case file describing no allegations of child abuse. All participants were then asked to complete a questionnaire assessing their decision to place the child into foster care and, if appropriate, the permanency of the foster care placement. Results revealed that participants were more likely to advocate for (longer) foster care placement when a child allegedly experienced severe or moderate physical abuse compared to when a child allegedly experienced mild physical abuse. Further, participants were more likely to advocate for (longer) foster care placement when a child experienced mild physical abuse compared to when there was no allegation of physical abuse.



EFFECT OF BACKGROUND COLOR ON MEMORY RECALL

Katie Hendy (Dr. Dalia Diab)

Department of Psychology

The purpose of this study is to examine if background color can enhance memory recall. Specifically, the current study focused on three background colors used in a PowerPoint presentation: blue, red, and yellow. These three groups were compared to a control condition: white background. PowerPoint presentations with the different colored backgrounds were created and presented to participants in different sessions; therefore, each participant received only one of the four conditions. All the presentations used black text and were identical, with the exception of the background color. The presentations consisted of a 3-slide presentation with a title, introduction, and a slide listing 20 randomly-selected words (which were obtained using a website that randomly generates words). After participants studied the words for 2 minutes, they were given 2 minutes to write down as many words as they could remember. If results show that specific background colors can enhance recall, then these findings have the potential to help students better retain information when studying.



RACE RELATIONS IN THE U.S.: CAN AGGRESSION PRIMING INCREASE LEVELS OF PERCEIVED AGGRESSION IN OTHERS?

Katherine Frank (Dr. Dalia Diab)

Department of Psychology

The purpose of this study is to show that in the general population, not only can observing aggressive acts lead to greater aggression in others, but this increased aggression will not be evenly distributed between races. Participants were assigned to one of four 1-minute videos containing either two Caucasians fist-fighting, two African-Americans fist-fighting, a Caucasian and an African-American fist-fighting or a non-aggressive control video. Participants were then asked to complete an Implicit Association Test to determine their levels of aggression. Participants also received a questionnaire to assess baseline levels of aggression, regardless of race involvement. When comparing perceptions of aggression of African Americans and Whites following aggression priming, it is hypothesized that an increase of aggression will be observed for both races, but that there will be a larger increase in perceptions of aggression of African Americans. Findings from this study will shed light on whether race-segregated aggression priming can increase implicit perceived aggression in the race of the individuals viewed.



INFLUENCE OF HIGH IDENTIFICATION WITH LOSING TEAMS ON FAN SELF-ESTEEM AND AGGRESSION

Katie Kasunick (Dr. Tammy Sonnentag)

Department of Psychology

For sports fans of losing teams, especially fans who are highly identified with the team, perpetual defeat can threaten their self-esteem and, ultimately, contribute to aggressive actions on behalf of the team. Consequently, the purpose of the current study is to examine the impact of sports team identification or sport fandom (i.e., the state of being a fan of someone or something) on individuals' self-esteem and willingness to engage in anonymous acts of aggression following recollections of a history of defeat. A total of 89 Xavier University psychology students took part in the study, where they first completed questionnaires assessing team identification. The participants were then randomly assigned to write and reflect on a time when their favorite sports team experienced a winning or losing season. The researcher then asked all participants to image their favorite sports team had just lost an important game against their biggest rival. Subsequently, participants were asked to complete questionnaires assessing their self-esteem and willingness to engage in aggressive acts. Inconsistent with prediction, sport team identification and winning or losing records did not affect participants' self-esteem after a loss. However, after a loss, high team identifiers were willing to engage more aggressive acts than low team identifiers, and this effect did not depend on whether participants recalled a winning or losing record.



INFLUENCE OF RESUME ORDER AND INTERVIEWER-APPLICANT SIMILARITY ON HIRING DECISIONS

Kendal Major (Dr. Tammy Sonnentag)

Department of Psychology

For years, researchers have identified several factors that influence interviewers' hiring decisions during personnel selection, such as order of applicants (e.g., primacy effect [PE], recency effect [RE]), and interviewer-applicant similarity (IAS). Ideally, when an applicant's resume is reviewed by an interviewer, the applicant's qualifications, such as credentials and accomplishments are considered; however, there may be factors, other than an applicant's qualifications, that influence interviewers' hiring decisions. The present study examined the influence of IAS and order effects (both PE and RE) on hiring decisions. Participants included 59 undergraduate students (16 males, 43 females) age 18-22 ($M = 19.83$ years, $SD = 1.26$ years). After reading an informed consent document, participants took a bogus "workplace personality" test electronically. After completing the work place personality test, participants were asked to review three resumes after being randomly assigned to one of two conditions: 1) review a similar applicant's resume first (and dissimilar applicant last) or 2) review a dissimilar applicant's resume first (and similar applicant last). After reviewing the resumes, participants evaluated each applicant using a 7-point Likert scale ranging from 1 (*unlikely to hire*) to 7 (*likely to hire*). Results revealed that applicants similar to an interviewer were more likely to be hired than applicants dissimilar to an interviewer. The present findings provided valuable information about interviewers' hiring decisions, which have implications for helping applicants increase their likelihood of succeeding during a job interview.



DOES EXPERIENCE MATTER? THE EFFECTS OF EXPERIENCE ON ATTITUDES ABOUT MENTAL ILLNESS

Cale Kaminsky (Dr. Cynthia Dulaney)

Department of Psychology

Although depression is a devastating mental illness, not everyone perceives mental illness as a serious condition. However, personal experience with mental illness may be one factor that influences people's understanding and prosocial attitudes toward mental illness. Therefore, the effects of personal experiences on people's perceptions of depression in terms of perceived prevalence, risk, and importance of personally helping people with depression were investigated. Seventy-five undergraduate students completed a questionnaire about their personal experiences with depression. Based on the results of the questionnaire, participants were designated as those with high experience versus low experience with depression. After completing a reflection task, participants completed measures of their attitudes and perceptions about depression. The results indicated that participants with high personal experience with depression ($M = 63.86$, $SD = 30.18$) rated their risk of developing depression significantly higher than participants with low personal experience with depression ($M = 35.60$, $SD = 24.12$), $t(85) = 3.82$, $p = .001$. However, there was no significant difference between these two groups in terms of perceived prevalence of depression, $t(85) = .19$, $p = .84$, or importance of personally helping people with depression, $t(85) = .50$, $p = .62$. The findings suggest that, although perceived risk may increase with personal experience of mental illnesses, more research should be conducted to understand what influences people's perceptions and attitudes toward mental illnesses.



THE EFFECTS OF A SINGLE-SESSION BREATHING MEDITATION ON ANXIETY LEVELS FOLLOWING AN ACUTE STRESS INDUCTION

Heather Little (Dr. Tammy Sonnentag)

Department of Psychology

College students experience relatively high levels of anxiety, which can be harmful to their health given the associations between anxiety and increased stress levels, depression, and decreased cognitive functioning. Meditation has been shown to successfully reduce anxiety levels over time. The purpose of the current study is to investigate the effects a single-session of a breathing meditation on college students' anxiety levels. A total of 107 undergraduate students from Xavier University participated in this study. Participants were randomly assigned to either a stress induction or no stress induction condition, where they were asked to write about and reflect on a stressful or non-stressful class, respectively. Then, participants completed a State Anxiety questionnaire to assess their anxiety levels. Next, participants were randomly assigned to either a breathing meditation or a "sit quietly" condition. In the meditation condition, participants listened to an audio recording that guided them through the breathing meditation. During the audio recording, participants were asked to pay attention to their bodies, and how their breath moved through their bodies. Next, participants re-completed the State Anxiety questionnaire. Results revealed that the stress induction manipulation was successful, students who wrote about and reflected on a stressful class reported greater anxiety than students who wrote about and reflected on a non-stressful class. Further, when examining if breathing meditation successfully reduced college students' anxiety, the results revealed that a single-session of a breathing meditation significantly lower college students' anxiety levels in both the stress and no-stress induction conditions. This finding suggests that a single-session of a breathing meditation can benefit all students, regardless of the extent of their anxiety.



PERCEPTIONS OF INTIMATE PARTNER VIOLENCE IN YOUNG ADULTS

Alexa Deutsch (Dr. Cynthia Dulaney)

Department of Psychology

Little is known about young adults' ability to recognize situations of intimate partner violence (IPV). The current study examined potential differences in recognition of IPV among three types of relationship abuse: physical, sexual, and emotional/psychological. It was hypothesized that an instance of emotional/psychological abuse would be recognized significantly less than one of physical or sexual abuse. A running total of 96 undergraduate students read one of three vignettes, each depicting one specific type of relationship abuse. Participants were asked to judge the interaction following the reading. Preliminary results showed significant differences across all three conditions, $F(2, 92) = 21.43, p < .001$. Findings suggest sexual abuse is most readily recognized by young adults, followed by physical abuse, and finally emotional/psychological abuse.



DEPRESSION, SCHIZOPHRENIA, AND THE DEFENDANT'S AGE: WHAT DO MOCK JURORS DECIDE?

Nneka Bonner (Dr. Dalia Diab)

Department of Psychology

The current study examined how the type of mental illness and the age of a defendant could affect mock jurors' decision to give them the not guilty by reason of insanity (NGRI) verdict. Due to society's empathy towards the mentally ill, mentally ill defendants are more likely to receive the NGRI verdict (Mossiere & Maeder, 2016). Research has also shown that jurors tend to be more lenient towards younger defendants (Semple & Woody, 2011). Therefore, it is hypothesized that defendants who are schizophrenic and defendants who are young teens will receive more lenient sentencing. This study used a 2 x 3 between-subjects factorial design, where participants were randomly assigned to one of six conditions that differed on the defendant's mental illness (depression or schizophrenia) and the defendant's age (13, 17, or 21). Participants read jury instructions from the Ohio Public Defender, a manipulated trial transcript of State v. Kinkel, and were asked to indicate what verdict they would give the defendant. They also completed questionnaires about their attitudes and beliefs towards mental illness. Findings from this study will shed light on what factors could lead to more lenient sentencing. *Keywords:* mental illness, age, mock juror decision making.

EFFECTS OF STEREOTYPE MESSAGES ON FEMALES' EXPRESSION OF EMOTION

Rebekah DePretis (Dr. Tammy Sonnentag)

Department of Psychology

One of the most widely accepted stereotypes about gender in our culture is that women are more emotional than men. However, many studies (see, for example Barrett, Robin, Pietromonaco, & Eysell, 1998) have found that empirical evidence does not support this stereotype. The current study aims to investigate the effects of (explicit and implicit, positive and negative) stereotype messages on females' willingness to express emotion and actual expression of emotion. A total of 92 female undergraduate students were recruited and randomly assigned to one of four conditions, in a 2 (Stereotype Valence: Positive or Negative) x 2 (Stereotype Message: Explicit or Implicit) between-subjects design. Participants were presented with messages that either explicitly or implicitly described women as more or less emotional than men, leading to negative or positive consequences for women, respectively. All participants were then asked to report their emotions using the Positive and Negative Affect Schedule (Watson, Clark, & Tellegan, 1988) and complete a writing task assessing their actual "Emotion Recollection". Results revealed that 1) the positive or negative nature of the stereotype (i.e., Stereotype Valence) did not significantly affect females' willingness to report emotion, but did affect females' actual expression of emotion, 2) females exposed to explicit messages reported less willingness to report emotion than implicit messages (i.e., Stereotype Message), yet did not have a significant effect on females' actual expression of emotion and, lastly 3) explicit negative stereotypes caused female participants to be less willing to express emotion and to actually express less emotion, while explicit positive stereotypes caused female participants to be more willing to express emotion and to actually express more emotion.



EFFECT OF VIDEO GAME DIFFICULTY ON COLLEGE STUDENTS' AGGRESSIVE THOUGHTS

Dylan Follett (Dr. Dalia Diab)

Department of Psychology

Nowadays, video games are more advanced, and there is controversy regarding the violent content of some types of video games. The purpose of this study is to examine if video game difficulty could increase college students' aggressive attitudes. Participants were assigned to one of two conditions: the easy game condition or the hard game condition. Participants in the easy game condition played Tetris, whereas participants in the hard game condition played Bastard Tetris, which is a more difficult version of Tetris. It is hypothesized that participants in the hard game condition will experience more frustration and thus report significantly higher levels of aggression than participants in the easy game condition. Findings from this study will shed light on whether playing a difficult video game could increase aggression in college students.



ARE PRESCRIPTIVE AND PROSCRIPTIVE MORAL BEHAVIORS A MATTER OF PERSONAL PREFERENCE?: EXAMINING THE MODERATING ROLE OF MORAL IDENTITY

Stephanie Schaeper, Laura Willman (Dr. Tammy Sonnentag)

Department of Psychology



Moral psychology distinguishes between two forms of moral motivation based on approach-avoidance differences in self-regulation: the “proscriptive moral motivation” (i.e., avoidance orientation) focuses on what people *should not do* and is perceived to be mandatory and strict, and the “prescriptive moral motivation” (i.e., approach orientation) focuses on what people *should (ought to) do* and is perceived to be discretionary and not strict (Janoff-Bulman, Sheikh, & Hepp, 2008). Moral codes like “not harming others” are proscriptive and perceived to be a mandatory component of human interactions, whereas “helping others” is prescriptive and perceived to be a matter of personal preference (Higgins, 1988). Despite the presence of these two moral systems, the perception of proscriptive and prescriptive moral behavior may depend on individuals' moral identities—the degree of centrality of morality to individuals' identities (Aquino & Reed, 2002). That is, individuals' moral identities may influence whether proscriptive or prescriptive behaviors are perceived as a matter of personal preference. A total of 68 individuals, between 19-66 years of age ($M = 26.28$, $SD = 3.38$) were recruited to participate in this study, using a snowball sample, via an advertisement on social media sites. Participants were asked to complete a measure of moral identity, a measure of their perceived moral qualities, and rate the degree to which 14 prescriptive (e.g., be honest) or 14 proscriptive (e.g., be aggressive) moral behaviors are a matter of personal preference. Participants were also asked to complete a measure of social desirability. Using hierarchical regression analyses, the results revealed that, after controlling for social desirability, the more moral an individual perceived themselves to be (both for moral identity [see Figure 1] and perceived moral qualities), the less they believe that proscriptive moral behaviors are a matter of personal preference. In contrast, individuals' morality (both moral identity and perceived moral qualities) was not significantly associated with perception that prescriptive behavior is a matter of personal preference. Results suggest that as individuals' morality increases, the decision to engage in “should not” moral behaviors (e.g. lying, stealing) is not up for negotiation. Directions for future research will be discussed, including the idea that as individuals' morality increases they may more effectively identify consequences of proscriptive behaviors than rewards for prescriptive behaviors.



EFFECT OF A MINOR'S AGE ON PERCEPTIONS OF CHILD AUTONOMY IN MEDICAL DECISION MAKING

Wabi Tela (Dr. Dalia Diab)

Department of Psychology

Successful treatment of a patient requires the cooperation of both the patient and the physician. However, at times, the patient may disagree with the physician's recommendations. If that happens, physicians must respect the patients' decisions and their overall autonomy even if it is against their recommendations, when the patient is not a minor. However, a minor's ability to make medical decisions is neither fully understood nor agreed upon. The purpose of this study was to learn more about people's perceptions of child autonomy in medical decisions, particularly if the age of the child affected their opinions. It is hypothesized that participants will be more likely to respect the child's decision the older the child is. The independent variable for this study was the age of the patient with four levels: 7 years old, 12 years old, 17 years old, and no age presented. Participants were given a vignette featuring one of the four conditions and asked to complete a survey regarding their perceptions of a child's autonomy in medical decision making. Findings from this study will shed light on whether a minor's age affects people's perceptions of a child's capability to make a competent decision in a medical situation



SOCIAL AND DIMENSIONAL INFLUENCES ON SELF-EVALUATION AND AFFECT

Zenab Saeed (Dr. Tammy Sonnentag)

Department of Psychology

Previous research has demonstrated that social comparisons, which result from comparing one's own abilities to peers' abilities, contribute to individuals' identity formation and impact self-evaluations and affect (Festinger, 1954). Furthermore, individuals' self-evaluations are also influenced by dimensional comparisons, which occur when individuals compare their own ability between different domains (Möller & Marsh, 2013). The current study expands on previous research by studying the impacts of social and dimensional comparisons on self-evaluations and affect in the domains of academics and interpersonal skills, which are especially important in university-aged individuals' identity formation. A total of 245 university students first completed a test of academic or interpersonal skills and then received false peer comparison feedback reporting their performance (relative to their peers) as either below average, average, above average, or unknown (i.e., no comparison control condition). Participants then completed a self-evaluation measure in the same domain as the ability test (to assess social comparison influences), a self-evaluation measure in the other domain (to measure dimensional comparison influences), and a measure assessing their positive and negative affect. Results revealed that, while neither social nor dimensional comparisons impacted self-evaluations, peer comparison feedback significantly impacted participants' affect. The findings suggest that even though individuals' emotions are influenced by peer comparisons, comparison influences on individuals' overall self-evaluation assessments may be more complex.

Social Work



RELATIONSHIP BETWEEN THE CAUSE FOR REMOVAL TO THE INCREASE OF CHILDREN IN CARE AND THEIR TREATMENT LEVEL

Danielle Bennet (Dr. Jaylene Schaefer)

Department of Social Work

In the United States there is a long history associated with children being brought into care within a foster care network. Over the last few years, there has been a dramatic increase in the number of children being brought into care by Children's Protective Services in the United States. With the rise of the heroin epidemic occurring in many states and continuing to be on the rise, many professionals believe that there is causal relationship associated with the two, with few studies completed to support this idea. This current study delves into this research about the heroin epidemic by looking at the relationship between the children being brought into care as a whole and their treatment level. A total of 50 participants (24 female, 26 male, Mage = 85.02 months, SD = 58.465) had a survey completed by the researcher using secondary data to gain information from their referral stating the initial cause for removal and treatment level at intake.



THE AMERICAN RED CROSS AND THEIR RESPONSE TO HOME FIRES

Mirka Gallo (Dr. Jaylene Schaefer)

Department of Social Work

The Red Cross responds to home fires every eight minutes. The purpose of this research project is to assess the areas in which the Red Cross has responded to multiple fires. This information will be used to understand why this geographical area and population is more affected by fires, and if time allows to also assess if the Red Cross has installed smoke alarms in that area. This research project is exploratory and the method I am using is secondary analysis of cases from our case note system, which is called CAS. I will be going through the data to plot points as to where many of the fires we respond to are. When looking through the Red Cross data I will focus on fires during the whole year of 2016 in Hamilton County. After assessing, cleaning, and organizing the fire data, I will then assess the demographics of the neighborhood from census data. Since this project is exploratory I will be discovering why a certain area has so many fires and how the Red Cross can better assist their clients. As stated above if time allows I will be able to compare that to smoke alarm installation data in that certain area.



CHILDHOOD TRAUMA

Danielle Kochensparger (Dr. Jaylene Schaefer)

Department of Social Work

Hamilton County Job and Family services works with parents and children every day, and the purpose of this research is to examine if the parents that enter the agency have previous trauma in their lives including being a foster child or involved with the child welfare system when they were younger. To explore if such trauma is present, a survey will be distributed to about 10-15 clients of an ongoing case worker at children's services. The cases will be randomized as the researcher will not know which cases the worker will be going on until the day that data is actually collected. The questionnaire will ask basic questions such as if the client recalls having any involvement with children's services as a child, if they were ever involved in foster care, and other basic demographic questions. The researcher will then study the responses to the survey to examine possible any possible connections between past childhood trauma and their current children's services case.

Sociology

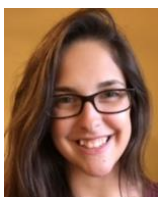


ASSESSMENT OF FINANCIAL CONCERNS AND FOOD INSECURITY AMONG XAVIER UNIVERSITY STUDENTS

Peri Drury, Maddison Blackwell, Madeline Flores (Dr. Kandi Stinson, Ms. Michelle Early)

Department of Sociology

The problem of food insecurity is becoming more apparent on college campuses throughout the United States. The rising cost of living includes college tuition, which puts a strain on college students' finances, which affects students' food security. Multiple studies indicate that students' financial characteristics such as low socioeconomic status, a need for tuition assistance, financial support, and student loan and credit card debt are related to food insecurity (Gains, A., Robb, C. A., Knoll, L. L., Sickler, S., 2014; Hughes, R., Serebryanikova, I., Donaldson, K., & Leveritt, M., 2011; Coleman-Jensen A, Gregory C, Singh A., 2014). Because of this, we hypothesize that food insecure students are likely to work more hours per week than food secure students. We also hypothesize that students who receive non merit-based financial aid or experience housing insecurity are more likely to be food insecure. Data was collected by means of an online, cross-sectional survey run through Qualtrics Survey Software. A link to the survey was distributed via email to 2,867 students who live in on campus apartments or off-campus and are not required to purchase a XU sponsored meal-plan, of which 898 students completed the survey. This research study aims to determine how the financial concerns of college students might affect whether or not undergraduate students at a midsized, private university experience food insecurity.



THE RELATIONSHIP BETWEEN FOOD INSECURITY AND FOOD PROCUREMENT STRATEGIES AMONG UNDERGRADUATE STUDENTS ON COLLEGE CAMPUSES

Laura Willman, Sarah Kramer (Dr. Kandi Stinson, Ms. Michelle Early)

Department of Sociology

Up until recently, food insecurity among college students has received little attention. However, previous research suggests that food insecurity is becoming an important issue that is affecting thousands of college students across the country (Dubick, Matthews, & Cady, 2016). The purpose of this research is to examine the relationship between food insecurity and food procurement strategies among undergraduate college students. The U.S. Department of Agriculture (2015) defines food insecurity as, "a household-level economic and social condition of limited or uncertain access to adequate food". This study highlights the following hypotheses: purchasing a meal plan reduces the likelihood of being food insecure; students who are food insecure consume fast food more frequently; food insecurity increases the likelihood students will attend free food events offered on-campus. An online survey was distributed to 2,867 full-time undergraduate students who live in on-campus apartments or off-campus, of whom 898 completed the survey. Respondents were asked questions about access to food, as well as finances, housing, and health. This research expands our knowledge and understanding of how college students cope with food insecurity and the strategies they use to procure food.

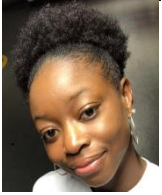




THE IMPACT OF FOOD INSECURITY ON THE MENTAL HEALTH AND ACADEMIC PERFORMANCE OF COLLEGE STUDENTS

Martha Thompson, Emma Nelson (Dr. Kandi Stinson)

Department of Sociology



Recent studies involving children have found that mental health issues and academic performance are affected by food insecurity. Jyoti, Frongillo, and Jones (2005) found that food insecurity among children ages 6-12 years old was associated with poorer mathematics scores, grade repetition, absenteeism, tardiness, and anxiety. This research raises the question of whether college students experience similar consequences of food insecurity on their mental health and academic performance. An online survey was sent to 2,867 full-time undergraduate students who live in on-campus apartments or off-campus housing, that is, students not required to purchase a meal plan. We received a response from 898 students. The following hypotheses were tested: 1) Food insecure students are more likely than food secure students to experience depression, irregular sleeping patterns, and trouble concentrating, 2) Food insecure students are more likely than food secure students to miss a class, drop a class, or not perform academically as well as they would like. This study provides insight into the mental health and academic consequences of food insecurity on college campuses.