Morning Session Abstracts

AGRICULTURE

ASSESSMENT OF SUSTAINABILITY & DIVERSIFICATION PRACTICES OF PRODUCE AND FOOD RETAIL INDUSTRY

Presenter: Ackah, Randy
Graduate, Agriculture

Mentor: Prof. Aslihan Spaulding

Authorship: Randy Ackah

The corn and soybean monoculture has dominated Midwestern agriculture for decades and is engrained in our supply chains, infrastructure, and federal and state policies. While this pattern provides benefits for some, it has resulted in decreased economic opportunities, declining rural communities, and degraded environments. To address these challenges, the Diverse Corn Belt (DCB) – a five-year USDA-NIFA funded project – is focused on developing an evidence-based framework and vision of how to enable a more diverse agricultural landscape across the Midwestern Corn Belt (Illinois, Iowa, and Indiana).

We hypothesize that given the right enabling conditions, diversified farms, markets, and landscapes can generate a broader suite of economic, social, and ecosystem services benefits that provide more benefits than the current dominant corn and soybean system. Using an integrated and transdisciplinary approach, the DCB team is conducting a systemic analysis and assessment of viable pathways to enable a more diversified agricultural landscape across the Corn Belt. Contributing to the overall DCB project's objective, this survey seeks to identify the sustainability and diversification efforts of food retailers and marketing groups. To achieve this, data will be collected from members of the International Fresh Produce Association (IFPA) and the National Grocers Association (NGA). From these surveys, we seek to identify the farmer sustainability requirements demanded or preferred by these marketing groups while also investigating the market opportunities and barriers opposing sustainable agricultural products. This will address a crucial gap for producers, handlers, and retailers – identifying the best way to promote and communicate the importance of diversified cropping systems to their customer base.

This research is part of "#DiverseCornBelt (#DCB): Enhancing rural resilience through landscape diversity in the Midwest" and is supported by Agriculture and Food Research Initiative Competitive Grant no. 2021-68012-35896 from the USDA National Institute of Food and Agriculture. Project website: www.diversecornbelt.org.

FARMER DISPARITY STUDY, THE EXAMINATION OF ECONOMIC AND OTHER DISPARITIES ASSOCIATED WITH FARM OWNERSHIP AND FARM OPERATIONS IN ILLINOIS

Presenter:	Graybill, Susan Graduate, Agriculture
Mentor:	Prof. Aslihan Spaulding
Authorship:	Susan Graybill

In the United States, there is a deep belief that if people work hard, they will be successful. There is also a deep belief that everyone should have access to the same opportunities. The study aims to assist in determining whether this belief in equal access to opportunities for success is a reality in agriculture and, if not, to identify where and how disparities exist. The farmer disparity study was commissioned through Senate Bill 1792 and passed by the Illinois General Assembly in January 2021.

A survey research methodology is used to collect data from farmers in Illinois. Questions focused on identifying and comparing economic, land ownership, education, and other related differences among farmers with different demographics such as race, ethnicity, gender, and age and determining economic and other disparities associated with farm ownership and farm operations.

This research aims to help policymakers understand whether any groups in the state face barriers to farming and indicate areas where policy, funding, or programs could assist in alleviating difficulties due to differences in opportunities for success.

We received an Institutional Review Board (IRB) approval, which included recruiting scripts, survey questions, and consent forms, on September 7, 2022. Qualtrics was used to collect data. The survey will close at the end of March 2023. We will provide the preliminary results at the symposium.

The project was conducted in partnership with the Illinois Department of Agriculture, and researchers from University of Illinois, Southern Illinois University, and Western Illinois University.

EXPLORING AGRICULTURE THROUGH ART

Presenter: Hudson, Gabi
Undergraduate, Agriculture

Mentor: Prof. Maria Boerngen

This creative activity focuses on agriculture. This project's objective is to define what agriculture means to me, and express that through art and written words. I will be doing so by creating paintings with a written-up description to show the process by which I created each painting, and how each painting represents my views of agriculture. I will be further developing my art, writing, and communication through various components of the project. The methods I will be using to investigate this issue will be to pick distinct aspects of the agricultural industry and bring them to life in paintings. The importance of this project is to broaden the view of agriculture and break down the stereotype that agriculture is viewed as just farming from most of the population’s standpoint. As the population becomes more disconnected from the source of their food, fuel, and fiber, this project provides an opportunity to bridge that gap.

EXAMINING THE PERCEPTIONS OF PRECISION AGRICULTURE TECHNOLOGIES AND ON-FARM PRECISION EXPERIMENTATION

Presenter: Tibbs, Reagen
Graduate, Agriculture

Mentor: Prof. Maria Boerngen

Authorship: Reagen Tibbs, Maria Boerngen

For nearly 40 years, precision agriculture technologies have revolutionized the agriculture industry. Like many of the advancements in agriculture, these technologies have transformed how farmers produce the food, fuel, and fiber that our modern society demands. Precision agriculture is more than just one technology, but rather a whole suite of technologies such as combine yield monitors, GPS/autosteer, and variable rate application technology for seeding and nutrient application. Farmers can receive many benefits from using these technologies, including more efficient nutrient management that can reduce input costs and improve yields. In addition to these benefits, farmers can utilize these technologies to create experiments to test different production practices. These experiments, known as on-farm precision experimentation (OFPE), are considered the future of agricultural research by university researchers and can help bridge the divide between researchers and farmers.

However, if OFPE is the future of agricultural research, then farmers' views of OFPE and their interest in doing these experiments with researchers is an important step that must be taken. A needs assessment is a logical starting point to understand farmers' views on OFPE and related topics. There are two phases of this needs assessment. First, focus groups and interviews were conducted with a small number of Illinois farmers to gain initial insights into the potential viewpoints of the larger farming community. Once the themes and ideas were identified from these focus groups and interviews, a survey is currently being conducted. This online, anonymous survey has been distributed to farmers in several states to gather more perspectives from a more diverse group of participants to truly understand farmers' views. The results from this needs assessment will greatly contribute to the literature on OFPE and will help guide researchers and farmers in conducting successful experiments.

BIOLOGICAL SCIENCES

ROLE OF THE ARABIDOPSIS TRM18 PROTEIN IN CELL DIVISION AND CELL SHAPE

Presenter: Abdullah, Abu Habib Md
Graduate, Biological Sciences

Mentor: Prof. Viktor Kirik

Authorship: Abu Habib Md Abdullah, Omid Zare-Mehrjerdi, Sam McCoy, Viktor Kirik

Microtubule is a cytoskeletal array that plays a crucial role in cell division and expansion. Although plants don't contain Microtubule Organizing Centers (MTOCs) or centrosomes like humans, one protein called TONNEAU1 (TON1) shares similarities with the human centrosome protein called Fibroblast growth factor receptor 1 Oncogene Partner (FOP). TONNEAU1 (TON1) is necessary for microtubule organization in the cell cortex. One recruiter of TONNEAU1 is called TRM (TONNEAU1-like Recruiter Motif), and almost 34 TRM proteins have been identified by Drevensek et al. 2012, but most of their functions are remains unknown. Our goal is to reveal the functions of the TRM proteins in the cytoskeletal arrays, cell shape, and cell division plane of Arabidopsis. By using confocal microscopy, we found TRM18 protein localizes in the nuclear membrane. Furthermore, overexpression of the TRM18 protein changes cell shape and reduces the branching of trichomes. It suggests that the TRM18 protein plays a significant role in cell division and expansion of Arabidopsis. We are highly enthusiastic to investigate the contribution of TRM18 protein in microtubule nucleation and how its different motifs participate in nuclear envelope localization, branching of trichome, and preprophase band formation.

DETERMINING MOLECULAR TARGETS OF CORTICOSTEROID MEDIATED IMPROVEMENT OF DYSTROPHIC MUSCLES

Presenter: Aidoo, Erinda
Undergraduate, Biological Sciences

Mentor: Prof. Andrés Vidal-Gadea

Authorship: Erinda Aidoo, Kiley Hughes-Wiles, Annamarie Hyer, Andrés Vidal-Gadea

Duchenne muscular dystrophy (DMD) is a degenerative neuromuscular disorder that affects 1 in 3,500 males and is characterized by progressive muscle weakness, loss of ambulation, and premature death. DMD is caused by an absence of the dystrophin protein. There is currently no cure for DMD. Current treatments target the secondary inflammatory damage during the disease with the use of corticosteroids (i.e., Deflazacort and Prednisone). However, steroids have limited usefulness, and involve several severe side effects. Notably, the molecular mechanism of action for steroids in DMD remains elusive. Caenorhabditis elegans genetically and phenotypically model DMD through loss-of-function mutations in dystrophin homolog (dys-1). Like DMD patients, treatment of dystrophic C. elegans with Deflazacort and Prednisone improves their dystrophic musculature. To understand how these corticosteroids affect dystrophic muscle function we are conducting an RNA interference screen on potential steroid targets in nematode muscles. This strategy will help us identify potential molecular targets for therapeutics able to treat the muscles of DMD patients without the significant side effects of current treatments.

INVESTIGATION OF THE MECHANISM OF MAGNETIC TRANSDUCTION BY C. ELEGANS

Presenter:	Akinosho, Aalimah Graduate, Biological Sciences
Mentor:	Prof. Andrés Vidal-Gadea
Authorship:	Aalimah Akinpsho, Andrés Vidal-Gadea, Temitope Awe

Magneto-sensation, the ability to sense and use the magnetic field, is a phenomenon that is now established in many animals of various kingdoms. Although the mechanisms that magneto-sensitive animals use to sense magnetic field is still an area of debate, electromagnetic induction, chemical magnetoreception, and biogenic magnetite transduction are the three major hypothetical mechanisms proposed for magnetic field detection. Our lab recently described that the nematode C. elegans orient to magnetic fields in a light-independent manner. C. elegans use a pair of poly-sensory neurons (the AFDs) associated with temperature sensation to sense magnetic forces within magnetic fields. The main aim of my thesis is to establish the mechanism by which C. elegans detects magnetic fields. To this end, I am investigating and testing two of the hypothetical mechanisms for magneto-sensation previously proposed-magnetocaloric and magneto-mechanic mechanism. The former involving the heating or cooling of the magnetic material when the applied magnetic field changes while the latter involves magnetic particle orientation change caused by a force produced by the presence of a magnetic field. I present evidence that different temperatures elicit different magneto-taxis responses in C-elegans. Understanding how C-elegans orients to magnetic fields will help us understand how many other species interact with the earth magnetic field. This is particularly relevant in the context of an ever-increasing list of known magneto-tacting species, and in the context of the ongoing reversal of the earth’s magnetic field.

PARENTAGE ASSIGNMENT AND PEDIGREE CONSTRUCTION IN HOUSE WRENS

Presenter: Burnett, Hailey
Undergraduate, Biological Sciences

Mentor: Prof. Pirmin Nietlisbach

Authorship: Hailey Burnett, Pirmin Nietlisbach

An important overarching goal of evolutionary biology is to understand trait evolution and how organisms develop and adapt to cope with changing environmental conditions. As climate change impacts are increasing with time, this is becoming more important than ever. Pedigree and parentage data are useful tools that can be used to answer such questions and are useful for studying the consequences of inbreeding (i.e., reproduction among related individuals), and reproductive behaviors. Extra-pair mating is such a behavior in which members of a socially monogamous species mate with individuals that are not their social mate. There have been many studies done and debates surrounding the costs and benefits of this behavior. Here, a population of House Wrens (*Troglodytes aedon*) that have been studied since 1980 has been used to create pedigree data. Detailed pedigree (i.e., family tree) information across generations reveals relationships among family members and allows for the identification of extra-pair reproduction. To acquire this information, I tested fourteen repeated segments of DNA, known as microsatellites, that have been published in previous literature. I then tested microsatellite variability in our study population. This is important for distinguishing between potential parents based on their genetic alleles. The variable microsatellites will be used to identify parents of the juvenile birds for a family of House Wrens that I collected other data on during the Summer 2022 field season. By knowing the paternity assignments, I will be able to identify extra-pair mating behavior and construct a pedigree using software in R. Upon completion, I have determined which microsatellites are successful in our lab and can be used in future research and have constructed parentage information for use in pedigrees of our bird population. With this research, further questions can be studied in work about extra-pair reproduction, inbreeding, and adaptation to changing environments. Pedigree data and research like this are an important start for understanding the implications that growing issues, such as climate change will have on species across the globe.

ARE THEY READY? IMMUNE PRIMING AGAINST EMERGING INFECTIOUS DISEASES IN BUMBLE BEES

Presenter: Calhoun, Austin
Graduate, Biological Sciences

Mentor: Prof. Ben Sadd

Authorship: Austin Calhoun, Ben Sadd

Selective pressures from fitness losses associated with pathogen infection have led to the evolution of diverse mechanisms that alleviate pathogen harm. Invertebrates have evolved a memory-like innate immune response, called immune priming, which increases individual protection upon secondary pathogen exposure. This phenomenon can offer general or specific immune protection and can also occur across generations. Investigating the natural relevance of such protective phenomena is important for species of economic and ecological concern, like bumble bees, where novel pathogen exposure represent a threat to health. Here we explore the specificity of immune priming against emerging infectious diseases (EIDs), specifically the honeybee virus Israeli Acute Paralysis Virus (IAPV). We hypothesize that prior pathogenic experience boosts infection resistance and tolerance to secondary pathogen exposure, however, differential exposures will precipitate mismatch costs. We subjected worker bumble bees to different priming treatments, including injected low dose or heat-killed virus of IAPV, or non-infective double-stranded RNA constructs mimicking IAPV or Deformed Wing Virus (DWV). Subsequently, we quantified measures of infection tolerance (via survival assays) and resistance (via absolute pathogen loads by RT-qPCR) following a higher dose of IAPV either 2, 7 or 14 days after the priming treatment. We find no evidence for beneficial immune priming in this system. A follow up showed that this holds true independent of the secondary exposure dose. These results are concerning for native bumble bee health as they suggest evolved immune strategies shown to be effective against bacterial pathogens are not effective in the face of viral EID threats.

EFFECTS OF EXTRA-PAIR PATERNITY ON MALE HOUSE WREN (*TROGLODYTES AEDON*) PROVISIONING EFFORT AND NEST DEFENSE

Presenter: Dart, Avery
Graduate, Biological Sciences

Mentor: Prof. Pirmin Nietlisbach

Authorship: Avery Dart, Scott K. Sakaluk, Charles F. Thompson, Pirmin Nietlisbach

Some animals form socially monogamous pair bonds in which a male and female mate and raise young together. However, individuals within a socially monogamous pair bond may still mate with other individuals; this mating is defined as extra-pair mating (EPM). Extra-pair paternity (EPP) occurs when offspring arise from EPM. In wild birds, EPM is approximated by EPP. Males benefit from EPP by siring additional offspring without any investment aside from sperm, but the benefits of EPM for females are less clear. Females may gain fertility assurance, access to better foraging grounds, and nest protection from males, as males are incentivized to defend nests that may contain their young. There are also potential costs to EPM for females, including a decrease in paternal effort by their social mates if they suspect paternity threats. I will investigate how male provisioning and nest defense are affected by EPP. I will study these questions in a well-established house wren system. I will record provisioning behaviors with cameras and then determine paternity using genetic markers. Individuals will be visually identified by the colored bands on their legs. I will test if males with more extra-pair young in their nests reduced provisioning rates. I will also test if males are more likely to help defend a neighbor's nest against a great-horned owl model if they had sired offspring in that nest. Taken together, my research seeks to understand how EPP may benefit or cost females and how it changes male behavior.

TOWARD A CATALOG OF SYNTHETIC GENE DRIVERS BASED ON EXAMPLES FROM NEUROSPORA FUNGI

Group Leader: Draper, Katelyn Olivia
Undergraduate, Biological Sciences

Group Members: Melissa Abraham, Undergraduate, Biological Sciences; Shadiyat Batula, Undergraduate, Biological Sciences; Thera Bowen, Undergraduate, Biological Sciences; Pedro Galvan, Undergraduate, Biological Sciences; Sophie Krivograd, Undergraduate, Biological Sciences; Jalen Lee, Undergraduate, Biological Sciences; Michael Marcheschi, Undergraduate, Biological Sciences; John Munn, Undergraduate, Biological Sciences; Carolina Okleiteris, Undergraduate, Biological Sciences; Princy Patel, Undergraduate, Biological Sciences; Cole Rich, Undergraduate, Music; Balikisu Saliu, Undergraduate, Biological Sciences; Elizabeth Sponagle, Undergraduate, Biological Sciences; Bethany Wilder, Undergraduate, Biological Sciences

Mentor: Prof. Tom Hammond

Authorship: Melissa Abraham, Shadiyat Batula, Thera Bowen, Katelyn Olivia Draper, Pedro Galvan, Sophie Krivograd, Jalen Lee, Michael Marcheschi, John Munn, Carolina Okleiteris, Princy Patel, Cole Rich, Balikisu Saliu, Elizabeth Sponagle, Bethany Wilder, Tom Hammond

Gene drivers are genetic elements that transmit themselves to offspring in a biased manner. It may be possible to use this characteristic of gene drivers to control organisms that are harmful to human health. We aim to develop a catalog of synthetic gene drivers based on natural examples. Two examples are rsk and rfk-1, which exist in the genomes of Neurospora fungi. The rsk and rfk-1 gene drivers work together to increase their transmission rate to offspring. While rsk has a simple genetic structure, rfk-1 contains three complex DNA sequences called introns. We hypothesize that none of the rfk-1 introns contribute to its function. Here, we present results from experiments designed to test this hypothesis. Our results will aid future studies toward developing rsk and rfk-1-inspired synthetic gene drivers.

MUSCLE AND SENSORY EFFECTS OF P38KB AND GARS IN CHARCOT MARIE TOOTH DISEASE

Presenter: Duncan, Mackenna
Undergraduate, Biological Sciences

Mentor: Prof. Pirmin Nietlisbach

Authorship: Mackenna Duncan, Piotr Klos, Megan Cross, Lauren Naeger, Julia Martin, Alysia Vrailas-Mortimer

Charcot-Marie-Tooth Disease (CMT) is a progressive neuropathology caused by the deterioration of neuronal function in the peripheral motor and sensory nervous systems. Motor symptoms include tripping, ankle twisting, and clumsiness, and sensory symptoms include sensations such as pins and needles and burning pain. There are no preventive therapeutics, but mutations in several tRNA-synthetase genes have been implicated in causing CMT. Though mutations in a variety of genes can give rise to CMT, several of the genes are tRNA-synthetases. We have recently found that the p38 MAPK (p38Kb), a kinase involved in aging and age-dependent locomotor deficits, regulates the levels of several tRNA-synthetase proteins during aging. p38Kb interacts with the Chaperone-Assisted Selective Autophagy (CASA) complex to mediate the degradation of misfolded or nonfunctional proteins, a process that contributes to clearing tRNA-synthetase proteins that are damaged from aging. Failure to clear damaged proteins may result in disease symptoms or worsening of symptoms. We hypothesize that p38Kb-mediated regulation of tRNA synthetase degradation is crucial for maintaining proper neuromuscular function. Utilizing D. melanogaster, we tested to see how GARS mutants affect locomotor function via muscle and sensory pathways. Muscle and sensory expression of GARS mutants induced locomotor dysfunction in both males and females. Next, we plan to combine knockout of p38Kb and GARS mutants in the muscles of D. melanogaster and test for the effects on locomotor function. Knockout of p38Kb has been previously shown to worsen locomotor function. Therefore, we predict that knockout of p38Kb and expression of GARS mutants will induce severe locomotor dysfunction due to the failure of mutant GARS clearance from muscle cells. Overall, GARS mutants induce locomotor dysfunction in D. melanogaster by both muscle and sensory channels and future studies will help us better understand the relationship between GARS and p38Kb in CMT2D.

TURTLE B CELLS FOUND TO HAVE TWO MAIN FUNCTIONS

Presenter: Fairow, Christen
Graduate, Biological Sciences

Mentor: Prof. Laura Vogel

Co-Mentor: Prof. Rachel Bowden

Authorship: Christen Fairow, Rachel Bowden, Laura Vogel

B cells, a type of white blood cell, are crucial components of the immune system during an infection that produce soluble molecules known as antibodies. Subsets of B cells exist in mammals that differ in function; however, it is not known how B cells function or if different cell subsets exist in reptiles. Understanding how B cells function in reptiles can help protect endangered species by clarifying how their immune system may be different from other vertebrates but may also allow for the development of new human medicines. We have previously found that reptile B cells had a special function that most human B cells do not – they could engulf and destroy invaders using a process called phagocytosis. We hypothesized that reptilian B cells differentiate during infection to either phagocytosis or antibody secretion depending on the size of the target particle. Particles that were too large to be engulfed would prompt the B cell to secrete antibodies while smaller invaders would be destroyed by phagocytosis. To test this hypothesis, we collected blood samples from wild red-eared slider turtles. Blood samples were processed in the lab and lymphocytes were incubated with fluorescent polystyrene beads (1 cytometry to determine if a B cell had captured any beads (or how many). We added an additional fluorescent dye to identify B cells from other white blood cell types. The results of our phagocytic assay showed that turtle B cells were able to engulf multiple 1 also were able to engulf one or two 6 examine antibody secretion. Turtle leukocytes were incubated in the lab for several days, with some samples receiving an additional infection signal, lipopolysaccharide (LPS). We found that turtle B cells could be detected with this method and that the cells incubated with LPS created more spots, indicating that they secreted more antibodies. These results further our understanding of how B cells function in reptiles.

IMPACTS OF DROUGHT AND COMPETITION ON A NATIVE PRAIRIE PLANT, *LOBELIA SPICATA*

Presenter: Fedorchak, Micah
Undergraduate, Biological Sciences

Mentor: Prof. Diane Byers

Authorship: Micah Fedorchak, Diane Byers

North American Tallgrass Prairies are highly diverse and productive ecosystems, which have suffered many adverse effects of habitat fragmentation in the past and are now faced with climate change. One perennial prairie plant, *Lobelia spicata*, is commonly found in these prairies and must compete with other plants (its own and other species) to obtain enough sunlight, water, and soil nutrients. With increasingly unpredictable changing conditions due to climate change, plants must tolerate the frequent lack of water due to longer seasonal droughts. This is accomplished in different ways, including changing root-to-shoot mass partitioning and drought avoidance or tolerance. To test how L. spicata reacts to these changing conditions, we decided to run a greenhouse experiment where we would subject the plants to contrasting types of competition (typically a strong effect among prairie plants) and differing intensities of drought. To assess the impacts on plants, we quantified biomass produced and relative allocation of their resources to roots vs. shoots. We proposed that increasing drought would decrease the overall size (biomass and an estimate of fitness) and shift the plants' relative allocation of resources to the roots (increasing foraging ability). We also proposed that competition will decrease the overall size of the plants, particularly for intraspecific competition where the greater similarity in leaves and roots could make the acquisition of light, water, and minerals difficult. Furthermore, we propose the combined effects of drought and competition would have a strong joint impact on the growth of the plants. We used a factorial design with 3 drought treatments and 2 competition treatments (intraspecific--a second *Lobelia* plant, and interspecific--another native prairie plant, *Lespedeza capitata*), as well as a reference treatment (no drought and no competition). The biomass of above- and below- ground matter of all plants was harvested and weighed. Analysis of total biomass found that there was only a significant effect of competition, with the intraspecific competition having a slightly greater impact. The root to shoot ratios shifted with the different competition treatments, so that the greatest allocation to the roots was with intraspecific competition. Increasing drought decreased plant size, but there was much variation within the treatments so we could not detect a particular impact. The variation in plant size and shifts in resource allocation illustrate the flexibility of plants in different competitive conditions.

THE EFFECT OF HABITAT ALTERATIONS ON EASTERN FOX SQUIRRELS' (SCIRIUS NIGER) FORAGING AND VIGILANCE BEHAVIORS

Group Leader: Freko, Justin
Undergraduate, Biological Sciences

Group Member: Jonathan Leppert, Undergraduate, Biological Sciences

Mentor: Prof. Rebekka Darner

Authorship: Justin Freko, Jonathan Leppert

The purpose of this research project is to investigate foraging behavior of behavior among Eastern fox squirrels (*Scirius niger*). We sought to address four research questions. First, is there a relationship between alert foraging in fox squirrels and the number of conspecifics, or members of the same species, present? Second, do fox squirrels forage less when there are humans present? Third, do fox squirrels show less vigilance in overcast conditions? Finally, in the presence of other conspecifics, do fox squirrels show an increase in foraging behavior? This study is important due to its implications for understanding habitat alterations, such as urbanization and weather conditions, on fox squirrel foraging and vigilance behavior.

SOCIAL, VIGILANCE, AND FORAGING BEHAVIOR WITHIN EASTERN GRAY SQUIRRELS AND EASTERN FOX SQUIRRELS

Group Leader: Green, Toni
Undergraduate, Biological Sciences

Group Member: Mackenzie Hunter Laney, Undergraduate, Biological Sciences

Mentor: Prof. Rebekka Darner

The purpose of this research project is to explore social, vigilance, and foraging behaviors among Eastern fox squirrels (*Sciurus niger*) and Eastern gray squirrels (*Sciurus carolinensis*). We sought to address four research questions. First, are fox squirrels less social during times of precipitation? Next, are Eastern gray squirrels more vigilant when humans are nearby? Third, are Eastern gray squirrels more active to forage depending on the time of the day? Finally, do Eastern fox squirrels spend more time foraging in sunny conditions in comparison to other cloud cover conditions? This study is important due to its implications for understanding how environmental conditions and human behavior impact squirrel behavior. Examining squirrel behavior allows better understanding of how they function and ecological roles they fulfill. It also allows us to make more educated predictions about their behavioral patterns and impacts on their surroundings.

VIGILANCE AND SOCIAL BEHAVIOR AMONG EASTERN GRAY SQUIRRELS IN THE PRESENCE OF HUMANS AND CONSPECIFICS

Group Leader: Greer, Jessica
Undergraduate, Biological Sciences

Group Member: Erik Kubiatowicz, Undergraduate, Biological Sciences

Mentor: Prof. Rebekka Darner

Authorship: Jessica Greer, Erik Kubiatowicz, Rebekka Darner

The purpose of this research project is to explore social and vigilance behaviors among Eastern gray squirrels (*Sciurus carolinensis*). We sought to address four research questions. First, are social behaviors more common among gray squirrels when there are no humans present, compared to when humans are present? Second, are social behaviors more common among gray squirrels when they are near conspecifics (i.e., members of the same species), compared to when they are alone? Third, are gray squirrels less vigilant when around conspecifics as opposed to when they are alone? Finally, does the presence of humans' influence squirrels' vigilance? This study is important due to its implications for understanding how conspecific and human presence influence social behavior and vigilance, which in turn may influence a squirrel's ability to detect predators.

FORAGING TENDENCIES OF THE EASTERN FOX SQUIRREL IN THE PRESENCE OF OTHER SPECIES

Presenter: Halvorsen, Boden
Undergraduate, Biological Sciences

Mentor: Prof. Rebekka Darner

The purpose of this research project is to explore foraging behavior among Eastern Fox Squirrels (*Sciurus niger*). I sought to address two research questions. First, is foraging among fox squirrels more common when there are fewer people around? Second, is foraging among fox squirrels more common when there are fewer dogs around due to the potential predator of the dog? To better understand the behaviors of the fox squirrel, it is important to know its foraging tendencies and influences on its adaptive behavior. By looking into foraging behaviors and how they are influenced by dogs and humans, further predictions can be made about fox squirrel foraging behaviors, such as how they might be impacted by predator introductions and urban sprawl. My first question is addressed by performing a linear regression, using number of humans present as the predictor variable and total foraging as the response variable. For my second question, I will be using the number of dogs present to predict total foraging. I predict that in both cases, there will be a positive correlation between the number of humans or dogs present and foraging observed.

VIGILANCE BEHAVIOR OF EASTERN GRAY SQUIRRELS

Group Leader:	Long, Gavin Undergraduate, Geography, Geology, and the Environment
Group Member:	Brennan Shaver, Undergraduate, Biological Sciences
Mentor:	Prof. Rebekka Darner
Authorship:	Gavin Long, Brennan Shaver

The purpose of this research project is to explore vigilance behavior among Eastern gray squirrels (*Sciurus carolinensis*). We sought to address four research questions. First, are gray squirrels on core college campuses less vigilant compared to those who live in other habitats (core college campus, riparian, coniferous forest, desert, and grassland)? Second, do gray squirrels who are on core college campuses spend more time foraging rather than alert foraging? Third, will gray squirrels express more vigilance behavior when there are humans within 15 m of them, compared to when there are no humans nearby? Finally, will gray squirrels exhibit less vigilance behavior with conspecifics within 15 m of them, compared to when there are no conspecifics nearby? This study is important due to its implications for understanding the effect of habitat alterations and human interactions on vigilance behaviors of squirrels. The habitat of a college campus is one that is full of humans most of the day for about nine months of the year. College campuses are potentially dangerous because squirrels that have been habituated to this urban environment could be at higher risk of predation, incidents with motor vehicles, and other deadly scenarios due to a decreased situational awareness from a lack of vigilance. As deforestation occurs and brings wildlife into closer contact with human society, it is important to understand the interspecific interactions of humans and squirrels. Understanding the effects that human presence has on the behavior of squirrels can help direct conservation efforts.

EASTERN FOX SQUIRREL VIGILANCE BEHAVIOR

Group Leader: Manisco, Mia
Undergraduate, Kinesiology and Recreation

Group Member: Kristin Koehn, Undergraduate, Biological Sciences

Mentor: Prof. Rebekka Darner

Authorship: Mia Manisco, Kristin Koehn

The purpose of this research project is to investigate vigilance and social behaviors among the Eastern Fox Squirrel (*Sciurus niger*). We sought to address four research questions. First, are fox squirrels less vigilant on a college campus/suburban environment than in forest (coniferous and deciduous), and agricultural areas? Second, are fox squirrels more or less vigilant around humans, compared to when humans are not nearby? Third, is there a correlated relationship between Fox Squirrels' vigilance and their proximity/distance to humans? Finally, are Eastern Fox Squirrels more social than Eastern Gray Squirrels (*Sciurus carolinesis*)? This study is important due to its implications for understanding how habitat, nearby related species, and humans impact behavior of the Eastern Fox Squirrel, a common resident of most habitats east of the Mississippi River.

CHARACTERIZING THE ROLE OF LIVER RECEPTOR HOMOLOG IN REGULATING CORTICOSTERONE METABOLISM

Presenter: Montalbano, Caitlin
Undergraduate, Biological Sciences

Mentor: Prof. Ryan Paitz

Authorship: Caitlin Montalbano, Ryan Paitz

During times of pregnancy embryos are extremely vulnerable and sensitive to changes in their environment, such as stress. Corticosterone is a hormone that is released during times of stress, and we have shown that embryonic exposure to maternal corticosterone can elicit a variety of effects in developing chicken embryos, including embryonic mortality. However embryonic metabolism of corticosterone can prevent lethal effects. Liver receptor homolog (LRH) is a receptor that may be involved in regulating the metabolism of corticosterone by controlling levels of the enzyme that metabolizes corticosterone. In this study, the hypothesis is that early embryonic exposure to an LRH blocker will cause low embryo weight and early mortality. By reducing the production of metabolic enzymes, the LRH blocker works by blocking the metabolic processes that are believed to be responsible for converting the lethal hormone corticosterone into an inactive version. We also tested the hypothesis that corticosterone plus the LRH blocker will result in lower survivability and lower embryo mass compared to the lethal steroid corticosterone by itself. The objective of this project is to support the statement that exposure to the LRH blocker, as well as corticosterone plus the LRH blocker, will result in low embryo weight and early embryo death. To test this hypothesis, chicken eggs were injected with the steroid corticosterone as well as corticosterone plus LRH, an inhibitor. Chicken eggs were also injected with oil to serve as the control group. Once the incubation process was done, embryos of each treatment were extracted and removed from the egg remains and then weighed on day 14. Injections of the LRH blocker resulted in a similar mass and survivability to the oil control group. Injections of corticosterone plus the LRH blocker resulted in a slightly lower embryo mass and survivability compared to corticosterone but the difference is not significant. Thus, our results do not support the hypothesis that injecting the eggs with an LRH blocker will result in low mass and low survivability. The results also do not support the additional hypothesis that the corticosterone plus LRH blocker treatment will result in lower survivability and mass compared to the corticosterone treatment.

SEX-SPECIFIC EXPRESSION OF TWO MAJOR ANTIOXIDANTS IN THE EXTRAEMBRYONIC MEMBRANES OF DEVELOPING CHICKENS

Presenter: Naugle-Gross, Eric
Undergraduate, Biological Sciences

Mentor: Prof. Ryan Paitz

Authorship: Eric Naugle-Gross, Ryan Paitz

Experiencing stress during embryonic development is associated with adult-onset diseases and conditions such as diabetes, hypertension, and other cardiovascular events. During stress, there can be a buildup of reactive oxygen species (ROS) resulting in irreversible oxidative damage to critical biomolecules. To protect against oxidative damage, embryos employ endogenous antioxidants to catalyze the reduction of ROS. Two families of antioxidants, thioredoxin and peroxidoxin, may play a significant role in redox regulation during development. In chickens, sex is determined by inheritance of sex chromosomes where an embryo with two Z (ZZ) chromosomes develops into a male while an embryo with a Z and a W (ZW) develops into a female. The gene for thioredoxin is located on the Z chromosome, while the gene for peroxidoxin is on chromosome 8. This led to the question: Do levels of thioredoxin and peroxidoxin differ between sexes? We hypothesized that there would be sex differences in thioredoxin expression because males have two copies of the gene, while females have a single copy. To address this, the membranes of 30 chicken eggs at day 4 were collected for the quantification of thioredoxin and peroxidoxin expression. Results show that there were sex differences in both antioxidant levels, with thioredoxin expression being higher in males and peroxidoxin higher in females. These findings support the hypothesis that thioredoxin and peroxidoxin expression in embryo development differ among sexes. Future studies will investigate functional consequences as a result of these differing levels.

DECREASING SEED GLUCOSINOLATE CONTENT IN THE OILSEED PLANT PENNYCRESS

Presenter: O'Flaherty, Spencer
Undergraduate, Biological Sciences

Mentor: Prof. John Sedbrook

Co-Mentor: Liza Gautam

Authorship: Spencer O'Flaherty, Liza Gautam, Ryan Bayliss, Autumn Salmon, Amanda Darcy, John Sedbrook

Pennycress (*Thlaspi arvense*) is a Brassica species related to rapeseed and canola that is being domesticated into an oilseed-producing winter cover crop called CoverCress to be grown between corn and soybeans in the U.S. Midwest. Pennycress seeds, like in other Brassicaceae, accumulate high levels of glucosinolates - over 100 µmol glucosinolate per gram seed weight. Glucosinolates act as deterrents to herbivory due to their bitter taste and conversion to toxic isothiocyanates by the enzyme, myrosinase. As with the domestication of rapeseed to canola, we aim to decrease pennycress seed glucosinolate content to less than 30 µmol/gm to make the seed oil and meal suitable for animal and human feed and food uses. We have targeted loss-of-function mutations in the pennycress MYC3 transcription factor gene using CRISPR-Cas9 genome editing, identifying a decrease in seed glucosinolate content to about 75 µmol/gm without affecting plant growth. We also generated MYC3 mutations in combination with mutations in the HAG1 and /or HAG3 transcription factor genes, through cross pollinations and/or CRISPR multi-plexing, identifying previously undescribed changes in seed glucosinolate content. We will present these findings and discuss our efforts combining these genetic changes with other mutations that improve agronomic traits and together constitute domesticated pennycress.

ALERT FORAGING AND VIGILANCE IN EASTERN GRAY AND EASTERN FOX SQUIRRELS

Group Leader: Ruem, Eric
Undergraduate, Biological Sciences

Group Member: Cory Moran, Undergraduate, Biological Sciences

Mentor: Prof. Rebekka Darner

Authorship: Eric Reum, Cory Moran

Purpose of this project is to explore alert foraging behavior among the Eastern Gray Squirrel (*Sciurus carolinensis*) and Eastern Fox Squirrels (*Sciurus niger*). We sought to address these four questions. First, is there an increase of alert foraging behavior while these species are in the presence of dogs? Second, does the time-of-day influence alert foraging behaviors in these species? Third, does cloud coverage influence vigilance? Finally, does proximity to safety influence alert foraging in these species? This study is important to understand the behavior of squirrels under specific conditions. From here predictions can be made about which factors influence squirrel behavior and their responses to environmental conditions.

VIGILANCE AND FORAGING BEHAVIOR OBSERVED IN THE EASTERN FOX SQUIRREL (SCIURUS NIGER) DUE TO ENVIRONMENTAL AND SOCIAL FACTORS

Group Leader: Simpkins, Tyler
Undergraduate, Biological Sciences

Group Member: Jack Kremer, Undergraduate, Biological Sciences

Mentor: Prof. Rebekka Darner

Authorship: Tyler Simpkins, Jack Kremer

The purpose of this research project is to examine vigilance behavior among the eastern fox squirrel (*Sciurus niger*). We sought to address four research questions. First, are squirrels near a human structure more vigilant? Second, are squirrels more vigilant in windy conditions? Third, does the number of conspecifics in the area affect foraging behavior? Finally, is there a relationship between the number of conspecifics in the vicinity and time spent showing social behavior? This study is important due to its implications for understanding how habitat alterations such as human-made structures, impact squirrel behavior. Also, this study helps us to understand how the number of conspecifics in the vicinity affect how squirrels' behavior changes depending on the number of conspecifics in the area.

DECIPHERING UROPATHOGENIC ESCHERICHIA COLI'S INCREASED RESISTANCE TO NEUTROPHILIC ANTIMICROBIAL HYPOCHLOROUS ACID

Presenter: Sultana, Sadia
Graduate, Biological Sciences

Mentor: Prof. Jan-Ulrik Dahl

Authorship: Sadia Sultana, Mary Crompton, Jan-Ulrik Dahl

Activated neutrophils generate reactive oxygen and chlorine species (RO/CS) to eliminate invading pathogens in a process named phagocytosis. Hypochlorous acid (HOCl) is the most potent neutrophilic RO/CS and kills pathogens mainly through widespread oxidative damage of cellular macromolecules. We discovered that uropathogenic Escherichia coli (UPEC), the common etiological agent of urinary tract infections, are substantially more resistant to HOCl exposure and neutrophil-mediated killing compared to intestinal E. coli pathotypes. We identified the molecular mechanism behind UPEC's increased HOCl resistance: upon exposure to HOCl, UPEC cells upregulate the expression of an operon consisting of three uncharacterized genes, rcrA, rcrR, and rcrB. We identified RcrB as a HOCl-sensing transcriptional repressor that represses the operon during non-stress conditions and that becomes inactivated during HOCl-stress, resulting in the expression of all three genes. Expression of rcrB is particularly crucial for UPEC's increased HOCl resistance as rcrB-deficient UPECs are as sensitive to HOCl as intestinal E. coli pathotypes. Alternatively, recombinant expression of RcrB in HOCl-sensitive intestinal E. coli renders the strains highly resistant to HOCl. Given that rcrB encodes an uncharacterized putative membrane protein, we hypothesized that its expression may control the HOCl uptake into the cell. We examined the extent of intracellular damage in rcrB-deficient UPEC as a proxy to quantify the intracellular HOCl level and found indeed substantially increased protein, lipid, and DNA damage in UPEC cells that lack RcrB. Our goal is now to decipher the precise mechanism of how RcrB controls the cellular HOCl influx, which will help us to better understand how UPEC survives in HOCl-rich environments such as the urinary tract.

IMPACTS ON VIGILANCE AND ALERT FORAGING BEHAVIORS IN THE EASTERN FOX SQUIRREL AND THE EASTERN GRAY SQUIRREL

Group Leader: Yatteau, Emma
Undergraduate, Biological Sciences

Group Member: Ashley Rodriguez, Undergraduate, Biological Sciences

Mentor: Prof. Rebekka Darner

Authorship: Ashley Rodriguez, Emma Yatteau

The purpose of this research project is to examine vigilance behavior among the Eastern Fox Squirrel (*Sciurus niger*) and alert foraging behavior among the Eastern Gray Squirrel (*Sciurus carolinensis*). We sought to address four research questions. First, does the number of conspecifics within 15 meters of the focal animal affect vigilance behaviors in Eastern Fox Squirrels? Second, does the habitat of the Eastern Fox Squirrel affect vigilance behavior? We will be focusing on the urban, grassland, deciduous forest, riparian, and agricultural biomes, in particular. Third, is alert foraging more common in Eastern Gray Squirrels when humans are present or absent? Finally, does the number of conspecifics within 15 meters of the focal animal influence alert foraging in Eastern Gray Squirrels? This study is important due to its implications for understanding how conspecific density, human presence, and habitat type impacts behavior in these common but ecologically important squirrel species.

CHEMISTRY

ENHANCED DETECTION OF ILLICIT DRUGS FROM PLASMONIC PAPERS VIA SURFACE ENHANCED RAMAN SPECTROSCOPY COMBINED WITH PAPER SPRAY IONIZATION-MASS SPECTROMETRY

Presenter: Adehinmoye, Adewale
Graduate, Chemistry

Mentor: Prof. Jun-Hyun Kim

Co-Mentor: Prof. Christopher Mulligan

Authorship: Adewale Adehinmoye, John Harms, Jeremy Driskell, Christopher Mulligan, Jun-Hyun Kim

Surface-enhanced Raman spectroscopy (SERS) is an analytical technique in which the vibrational signal of samples can be amplified by utilizing nanoscale plasmonic materials. Our previous work demonstrated the possibility of improving the detection limits of illicit drugs (i.e., cocaine, fentanyl, 2C-B, hydrocodone and JWH-018) on a plasmonic paper by designing a dual-instrument system consisting of paper spray ionization mass spectrometry (PSI-MS) and SERS. In this study, we attempted to induce the arrangement of the drugs and gold nanoparticles (AuNPs) onto a plasmonic paper to further improve SERS-based sensing capability without sacrificing the PSI-MS performance. This approach involves the generation of highly intense plasmonic environments for these drugs (e.g., vertically and laterally sandwiching drugs between plasmonic materials) where the SERS signals can be maximized by increasing the probability of plasmonic couplings. The optimized system can be served as a promising tool for the sensitive and selective detection of various analytes at low concentrations.

APPLICATIONS OF [5+2] CYCLOADDITIONS TOWARDS CLEAVABLE TETHERS

Presenter: Angles, Susanna
Undergraduate, Chemistry

Mentor: Prof. Andy Mitchell

Authorship: Susanna Angles, Andy Mitchell

Oxidopyrylium-alkene based [5+2] cycloadditions are a convenient intramolecular method of synthesizing complex seven-membered ring systems which are present in various biologically relevant molecules. Moreover, these molecules can serve as key intermediates, providing a framework upon which additional functionality can be added. Amide-tethered substrates were employed in this important reaction to produce polycyclic lactam systems. We hypothesized that when an electronically activated amide is utilized, the resulting product would be capable of undergoing various ring-opening reactions, allowing for the appendage of increased functionality. Additionally, this reaction would lead to the development of a net intermolecular [5+2] cycloaddition. Several nucleophiles were used in an attempt to cleave the N-tosyl lactam, with varying degrees of success. The ring-opened product was obtained in low yields, so a more robust substrate was synthesized for testing of future conditions.

LEAVING GROUP EFFECTS BASED UPON THE STRUCTURAL VARIATION OF THE ALKYL GROUP ON THE AQUEOUS REACTIVITY OF O-ALKYL CARBINOLAMIDES

Presenter: Arndt, Tom
Graduate, Chemistry

Mentor: Prof. Richard Nagorski

Carbinolamides are a class of compounds that have been shown to be vital in many biological processes. As interest in this functionality has continued to grow, a new class of O-alkylated derivatives of carbinolamides have been discovered that have interesting biological and pharmaceutical properties. The mechanism of the aqueous reaction of these carbinolamide derivatives is difficult to predict as alkylation of the hydroxyl group of the carbinolamide effectively blocks the primary routes by which carbinolamides are known to react. The acid and hydroxide-dependent mechanisms for the breakdown of carbinolamides both require the loss of the proton on the hydroxyl group as some point during their aqueous reaction and the O-alkylated compounds lack this proton. The understanding of the reaction of O-alkylated carbinolamides is further complicated by the fact that the mechanisms of their reactions have never been investigated. Studies from our group have shown that, under acidic conditions, the O-alkylated carbinolamides (1) react at the same rate as the related carbinolamide derivatives (2). It was concluded that loss of the O-alkylated group was very fast as compared to the reaction of the carbinolamides themselves. However, under basic conditions, the O-alkylated carbinolamides reacted much slower than their related carbinolamides but yielded the same reaction products. What is reported here is the reaction of a series of structurally similar O-alkylated carbinolamides where the structure of the alkyl group attached to the oxygen has been varied. It has been discovered that, in the hydroxide dependent reaction, the structure of the alkyl group has a significant effect on the rate of the reaction of the compound. This is the first evidence that has pointed to the rate determining step of the O-alkylated carbinolamides involving the loss of the O-alkyl group itself. The kinetic studies and their implications towards the understanding hydroxide-dependent O-alkylated carbinolamide breakdown will be discussed.

AMBIENT TEMPERATURE TANDEM REDUCTIVE AMINATION - [5 + 2] CYCLOADDITION

Presenter: Barnes, Andy
Graduate, Chemistry

Mentor: Prof. Andy Mitchell

Authorship: John Goodell

Cycloaddition reactions are of high interest for the synthesis of natural products due to their inherent ability to form multiple bonds in a single reaction. Noting the prevalence of the classic Diels-Alder reaction in the field of total synthesis, further study and optimization of similar cycloadditions should offer elegant new tools for the construction of the complex polycyclic structures often found in nature. Research in the Mitchell group focuses on intramolecular oxidopyrylium-alkene [5 + 2] cycloadditions to form ether-bridged seven-membered carbocycles within fused ring systems. Recent advances have led to room temperature cycloaddition, inspiring the development of an ambient temperature tandem reductive amination - [5 + 2] cycloaddition.

THE DEVELOPMENT OF AN ASYMMETRIC GLYCOLATE ALDOL ADDITION SYNTHETIC PATHWAY FOR THE PREPARATION OF POTENTIAL THERAPEUTIC AGENTS THAT TARGET INHIBITION OF THE MAIN PROTEASE (3CLPRO) OF THE NOVEL CORONAVIRUS (COVID-19)

Presenter: Carter, Austin
Undergraduate, Chemistry

Mentor: Prof. Shawn Hitchcock

Authorship: Austin Carter, Moses Martinez, Emmanuel Ayim, Jordan Witte, Bader Semakieh, Shawn Hitchcock

The worldwide pandemic started by the spreading of the novel coronavirus (SARS-CoV-2) led to many research groups pursuing medicinal agents to help manage the symptoms associated with this severe respiratory disease. It is known that the Covid-19 virus has many interconnected steps in its propagation life cycle. One of the key steps is conducted by an enzyme known as a protease. It is responsible for the propagation of the virus by cleaving key amide bonds in special proteins. Rathi and coworkers (1) pursued a computation study that revealed that there was a potential candidate that could act as a protease inhibitor. Working with X-ray crystal structure of one of the active protease enzymes (3Clpro), Rathi and his associates were able to carry out molecular dynamics simulation studies that demonstrated that a series of known HIV-1 protease inhibitors interacted well within the hydrophilic and hydrophobic regions of the protease. They also found a unique newly proposed structure was more efficient in fitting into this domain. This structure is a chiral molecule containing an p-fluoroaniline, and chiral amine and a secondary alcohol.

There are a number of physical properties of Rathi's proposed protease inhibitor that make it an ideal candidate for inhibition of the 3Clpro inhibitor. There are hydrogen bonding contacts with alpha-amino acid residue components involving histidine, serine, and cysteine. There are a series of hydrophobic interactions with phenylalanine, leucine, tyrosine, and proline components. Finally, there is a pi-stacking aromatic ring interaction between the proposed protease inhibitor and a secondary histidine component. The molecule proposed by Rathi and coworkers as a potential therapeutic candidate for the novel coronavirus was interesting to our research group as we have been developing chemistry suited to the synthetic preparation of HIV protease inhibitors. In this regard, this research poster will present the research that has been undertaken in our research group to synthesize the Rathi proposed protease inhibitor as well derivatives. The poster will cover the work that we have done in developing the asymmetric glycolate aldol addition reaction to suit its stereoselectivity towards the needed stereochemical elements in the proposed inhibitor. The poster will also cover the synthetic steps undertaken with the aldol addition product to achieve the synthesis of the key target.

BORON MEDIATED [5+2] CYCLOADDITIONS

Presenter: Corrie, Seth
Graduate, Chemistry

Mentor: Prof. Andrew Mitchell

Authorship: Seth Corrie, Andrew Mitchell

The Mitchell group's recent research has centered on the production and optimization of [5+2] cycloadditions utilizing maltol as a substrate. This is often achieved through the use of a tethered olefin which is attached to the maltol ring. The use of a tether reduces the entropic requirements necessary for a [5+2] cycloaddition. Unfortunately, a tether could limit the utility of [5+2] cycloadditions. One option to overcome this downside is to employ the use of a temporary tether that can be severed after the [5+2] reaction is completed. Preliminary reactions have shown the DABO ligand tether used by the group to generate cycloadditions in the past, is far more sturdy than initially believed. The current approach is to capture the boronic acid portion of the DABO ligand to produce potassium trifluoroborates that can be further utilized by coupling reactions. While the DABO ligand is an example of three points of binding in a tether, attempts have been made to create a tether with a single point of binding that is sturdy enough to undergo cycloaddition and labile enough to be cleaved under particular conditions. One potential route of cycloaddition is utilizing a silyloxypyrone with an atom of fluorine in its tether that can complex to an empty p-orbital in an electron deficient vinyl boron, which is particularly fluorophilic. This would ideally promote cycloaddition by bringing the vinyl boron olefin into position to cyclize, and then the boron-fluorine bond can be cleaved through multiple routes.

DEAROMATIVE OXIDOPYRYLIUM-BASED [5+2] CYCLOADDITION REACTION

Presenter: Erzuah, Marymoud
Graduate, Chemistry

Mentor: Prof. Andy Mitchell

Over the last decade, several developments and advancements have been made towards the oxidopyrylium-based [5+2] cycloaddition reaction which is geared towards the production of natural products. Given its worth, focus on reaction limitations and development of new reaction pathways continue to be of interest to synthetic organic chemists, providing avenues to a wide range of new heterocyclic seven-membered rings embedded within biologically active natural products. Due to the underlying application of oxidopyrylium-based cycloadditions, the Mitchell group has actively explored this area of research. Dearomative Oxidopyrylium-based [5+2] cycloaddition allows the formation of complex polycyclic compounds from readily available aromatic rings in a single step. Dearomatization of electron rich aromatic systems directly adds functional groups to aromatic cores to result in complex compounds with increased levels of saturation, stereogenic centers, chemical space, and new retrosynthetic disconnections. A synthetic approach involving the construction of fused seven-membered compounds via dearomative [5+2] cycloadditions between the 2π component derived from the C2=C3 bond of an aromatic compound and the pyrone is employed.

EFFECTS OF FUNCTIONAL POLYMER PARTICLES ON THE FORMATION OF GOLD NANOPARTICLES AND THEIR CATALYTIC PROPERTIES

Presenter: Eyimegwu, Faith
Graduate, Chemistry

Mentor: Prof. Jun-Hyun Kim

Authorship: Franklin Egemole, Pascal Eyimegwu, Jun-Hyun Kim

Composite particles consisting of gold nanoparticles (AuNPs) surrounded by a thermally responsive polymer derived from the copolymerization of N-isopropyl acrylamide (NIPAM) and acrylamide (AAm) were designed and tested as recyclable catalysts in various chemical reactions. The systematic incorporation of AuNPs into the PNIPAM-AAm copolymer particles was achieved by an in-situ method under light irradiation. The structural features (e.g., size, shape, and distribution) and overall loading efficiency of the integrated AuNPs were strongly influenced by the copolymer particle network and functional groups. The resulting composite particles were then tested as a catalyst in the C-C bond-forming reaction under various conditions including reaction time, temperature, base type, and catalyst amount to optimize their reactivity and selectivity, and recyclability. Understanding the influence of host polymer networks on the in-situ formation of guest metal nanoparticles, as well as their structural and catalytic properties, is essential for the development of novel and practical catalysts that can be utilized in various chemical transformation reactions.

THE REACTION OF N-(HYDROXYBENZYL)BENZAMIDES AND THE EFFECT OF METAL-DICATIONSON THE RATE OF THEIR AQUEOUS REACTION

Presenter: Gentry, Ashten
Undergraduate, Chemistry

Mentor: Prof. Richard Nagorski

Authorship: Paul Siena, Tak Koyanagi

Carbinolamides are intermediates in the formation of C-terminal alpha-amide peptide hormones where the alpha-amide is critical for hormone activity. The carbinolamide functionality has also been shown to be necessary for the bioactivity of the commercially available antibiotic, Bicyclomycin, in addition to carbinolamides having other roles which have both positive and negative impacts on the organism involved. While studies performed in the group have expanded our understanding of the mechanism by which these compounds react under aqueous conditions, many questions remain. One significant puzzle is the mechanism by which peptidylglycine alpha-amidating monooxygenase (PAM) catalyzes the breakdown of the carbinolamide intermediate generated during the synthesis of the peptide hormones from glycine-extended peptide precursors. The lyase portion of the bifunctional enzyme PAM contains a Zn2+ ion, whose role in catalysis is not well understood. It is known that if the Zn2+ is not present, the activity of the enzyme drops off. Proposed roles for the metal-ion include structural, zinc-bound hydroxide and a direct catalytic role where the substrate and metal interact with one another. The study described here will provide rate data for the acid and hydroxide dependent breakdown of N-(hydroxybenzyl)benzamide derivatives, and the proposed mechanisms for the acid and hydroxide reactions based upon the kinetic data provided and other results reported in the literature. The results of kinetic studies where the [Zn2+] was varied for both the acid-catalyzed reaction and the hydroxide-dependent reaction will be presented. Lastly the effect of increasing [Cd2+] on the hydroxide-dependent reaction will be presented and these results will be compared to the effect of added Zn2+. Based upon the metal-catalysis studies, a role for the metal-ion in the enzyme catalyzed reaction will be proposed.

INVESTIGATIONS INTO A NEW SYNTHETIC ROUTE TO CARBAPORPHYRINOID SYSTEMS

Presenter: Harris, Emily
Undergraduate, Health Sciences

Mentor: Prof. Timothy Lash

Porphyrins, aromatic pigments constructed from four smaller pyrrole rings, play a variety of biological roles and have medicinal applications. However, while porphyrins have been extensively studied, the properties of many porphyrin analogues are less well understood. Core modified porphyrins are known where one or more of the internal nitrogen atoms have been replaced by C, O, S, Se, Te or P. A useful synthetic method for preparing structures of this type is the so-called '3 + 1' version of the MacDonald condensation where aromatic dialdehydes are condensed with tripyrrolic intermediates known as tripyrranes. This strategy has been very successful but is limited in part by the accessibility of suitable dialdehydes. This difficulty has made access to porphyrinoid structures with cyclohexene or cycloheptene subunits problematic. In addition, attempts to prepare carbaporphyrin-type systems with phenalene subunits have been unsuccessful. In an attempt to overcome these difficulties, a synthetic route that uses cyclopropane dialdehydes as intermediates is being investigated. Cyclopropane dialdehydes with fused carbocyclic rings are required to construct new carbaporphyrinoid systems. Access to new porphyrin-like macrocycles will allow an assessment of how structural modification affects their reactivity, aromatic properties, and UV-visible absorption spectra. The new porphyrin analogues may find biological applications in areas such as photodynamic therapy and will help guide the direction of future research in carbaporphyrin chemistry.

A HIGHLY STEREOSELECTIVE SYNTHESIS OF A KEY INTERMEDIATE OF THE HIV PROTEASE INHIBITOR DARUNAVIR VIA AN ASYMMETRIC GLYCOLATE ALDOL ADDITION REACTION AND TRANS-AMIDATION

Presenter: Kant, Caitlyn
Undergraduate, Chemistry

Mentor: Prof. Shawn Hitchcock

Authorship: Caitlyn Kant, Shawn Hitchcock

Darunavir is an anti-viral medication used for the treatment of Human Immunodeficiency Virus Type 1 (HIV-1). The catalytic dyad, formed from 2 aspartate molecules, is responsible for breaking peptide bonds so that the peptide fragments can be used to propagate the virus. Darunavir is a protease inhibitor; it interacts with the aspartate molecules in the catalytic dyad to prevent further protease activity. Darunavir was first synthesized by Arun Ghosh, with a synthetic route of 11 steps. The current industrial route for Darunavir is rigid and does not allow for good flexibility in the synthesis of derivatives due to reliance on phenylalanine as the source for molecular stereochemistry. Our proposed synthetic pathway, only 8 steps, is more efficient and flexible in terms of synthesizing new derivatives on certain key regions. We are seeking to develop a more efficient stereoselective method for the synthesis of Darunavir and new Darunavir derivatives that may have improved efficacy in terms of inhibitory concentrations, using an asymmetric glycolate aldol addition approach.

AMIDE ASSISTED OXIDOPYRYLIUM [5+2] CYCLOADDITIONS

Presenter: Promise, Ifeanyichukwu
Graduate, Chemistry

Mentor: Prof. Andy Mitchell

The ability to synthesize cycloadducts from simple molecules is continually being developed by organic chemists and it is considered as one of the most useful tools in organic synthesis. This is because there are many naturally occurring biomolecules containing larger ring sizes (such as the seven membered ring), which synthetic chemists seek to make with readily available starting materials. The Mitchell research group is focused on understanding various factors, limitations and mechanisms related to the silyloxypyrone-alkene [5+2] cycloaddition reaction. In general, intermolecular cycloadditions are difficult to come by, however, we successfully synthesized different cycloadducts with various amide tethers via an intramolecular [5+2] cycloaddition mechanism at moderate temperatures. Amide tethers with bulky groups, tend to lock the alkene / Indole moiety, underneath the pyrone towards an achievable cycloaddition. In due course, we propose the ability to cleave the amide bond of these cycloadducts to assist additional promising synthetic routes.

EVALUATION OF RUTHENIUM (III) METAL-BASED COMPLEXES ON AMYLOID-? AGGREGATIONS USING GLIOMA CELLS AS A MODEL SYSTEM

Presenter: Saleh, Eaman
Undergraduate, Biological Sciences

Mentor: Prof. Marjorie Jones

Authorship: Michael Webb, Marjorie Jones, Eaman Saleh

Approximately 55 million people worldwide struggle with dementia and around 60-70 % of those cases can be attributed to Alzheimer’s Disease (AD) 1. Alzheimer's is a devastating neurological disorder characterized by Amyloid- β peptide aggregations in the brain. These aggregations typically express high levels of metal ions, which can be exploited as potential drug therapeutics2. Previous hypotheses regarding synthesis and classification of Ruthenium (III) complexes with pyridine-based ligands as modulating agents for Amyloid- β aggregations have implicated the successful coordination between the two3. They have also concluded a series of characteristics such as amino-substituted pyridine ligands that show inhibitory effects on peptide aggregations whilst maintaining minimal cell cytotoxicity3. Following the results of the study, we proposed a new unique set of compounds to further investigate the characteristics of Ruthenium (III) complexes that pose inhibitory effects on Amyloid- β peptide as well as assess their inherent cell cytotoxicity. To be viable therapeutics, the compounds must not be harmful to cells impacted by Amyloid- β aggregations. Using glial cells as a model system, the potency of the Ruthenium metal complexes against peptide plaques can be assessed. Upon conducting a cell viability MTT assay, we found that of the 15 proposed compounds, none had apparent cytotoxic effects deeming them worthwhile for continual investigation. A second MTT will be run to gauge the effectiveness against breaking down the peptide previously administered to the glial cells. Our results indicate that more sophisticated in vitro studies are necessary for a better understanding of the interaction between Aβ and amino-substituted pyridine ligands. For example, testing the cytotoxicity and the effectiveness of compounds against Aβ in a co-culture of glial cells and neurons to more accurately convey the cellular makeup of the brain; thus, instigating a solid foundation for future in vivo studies and development of treatments for Alzheimer’s disease.

SYNTHESIS, CHARACTERIZATION AND AQUEOUS KINETICS, AS A FUNCTION OF PH, FOR N-(HYDROXYMETHYL)PHTHALAMIDINES

Presenter: Shukla, Richa
Undergraduate, Chemistry

Mentor: Prof. Richard Nagorski

Authorship: Richa Shukla, Michael Burke, Richard Nagorski

The formation of carbinolamides occurs via the reaction of an amide with an aldehyde followed by a proton shift. While the functionality is not well understood and has roles in several biological venue, its intermediacy in the pathway leading to alpha-amidated peptide hormones has brought greater attention to determining how these molecules react. More recently a variety of compounds, having interesting biological function, have been discovered that have carbinolamides with broad structural variation. The role of the carbinolamide in the function of these compounds is not understood but the carbinolamide does represent a more reactive species in the structure of the molecule. Previous studies of carbinolamides have focused on structural variation on both the amide and aldehyde portions of the carbinolamide structure, with no compounds having N-substitution. The purpose of the study presented here was to synthesize a N-alkylated carbinolamide from phthalimide and formaldehyde. The spectroscopic characteristics of N-(hydroxymethyl)phthalamidine will be presented and their aqueous kinetics as a function of pH. The kinetic results will be compared to similar carbinolamides with no substitution on the nitrogen.

PORPHYRINOID SYSTEMS INCORPORATING HETEROAROMATIC SUBUNITS

Presenter: Ujah, Victoria
Graduate, Chemistry

Mentor: Prof. Timothy Lash

Authorship: Victoria Ujah, Timothy Lash

Porphyrins and related macrocycles with fused aromatic rings have attracted attention due to their extended chromophores. Also, the altered coordination chemistry and varying degrees of the aromatic character of carbaporphyrins and heteroporphyrins in which one of the nitrogen atoms of the porphyrin macrocycle is replaced by carbon, oxygen, sulfur, selenium, tellurium, or phosphorous, have been the subject of numerous investigations. However, little work has been carried out on porphyriniod systems incorporating fused heteroaromatic rings.

Extensive research has been done on the 9,10-phenanthroline system due to its fascinating reactivity as an inorganic ligand. Although porphyrins with fused phenanthroline units (1) have been synthesized using the MacDonald 3+1 methodology, this strategy has not been applied to related porphyrinoid systems. A phenanthroline-fused tripyrrane was prepared in three steps from a nitrophenanthroline. Following the preparation of a ring fused pyrrole ethyl ester, reaction with KOH and ethylene glycol at 180 oC gave an α-unsubstituted phenanthrolinopyrrole, and subsequent condensation with 2 equivalents of acetoxymethyl pyrroles in acetic acid-isopropyl alcohol gave the required tripyrranes. These were condensed with a series of dialdehydes to give ring fused carbaporphyrins, heteroporphyrins and related systems (structures 2-6). It is anticipated that the presence of external coordination sites will enable coordination of metal cations both within the macrocycle and at the external nitrogens.

COMMUNICATION

ROLE OF SOCIAL MEDIA IN MEANINGFUL INTERCULTURAL RELATIONSHIPS

Presenter: Agbasiere, Chinyere
Graduate, Communication

Mentor: Prof. John Baldwin

It is impossible to separate social media from intercultural relationships in today's increasingly digitalized society. Social media now provides individuals from various cultural backgrounds an environment to foster and maintain relationships. This research aims to assess social media's role in meaningful intercultural relationships. The survey was done using a qualitative method, and 50 students from four continents filled out the online survey. The analysis of this study shows the different roles that social media has played in intercultural relationships.

BEING IN A FOREIGN LAND: AFRICAN INTERNATIONAL STUDENTS' PERCEPTIONS OF COMMUNICATION STRATEGIES USED BY AND WITH HEALTH PROFESSIONALS

Presenter: Amoakwa, Agnes
Graduate, Communication

Mentor: Prof. John Baldwin

African international students often face difficulties in adapting to a new healthcare system. Understanding their perceived barriers and perception of communication strategies that health professionals employ in utilizing campus healthcare services is crucial for implementing new approaches so that these communities of students can benefit from the available resources. In this paper, I interviewed 7 African international students attending a large Midwestern U.S. university who had visited the campus healthcare service, had first-hand positive and negative experiences, and could provide rich and well-detailed information. According to the findings, various barriers hinder African international students' access to healthcare: knowledge regarding health insurance coverage, language barrier, and the high cost of healthcare. The study also showed that African international students perceived communication strategies employed by health professionals as friendly and welcoming. Participants expressed that health professionals communicate with them on a personal level.

TEACHERS' PERCEPTION OF FACTORS THAT MOTIVATE STUDENT LEARNING IN AN ONLINE CLASS

Presenter: Lasisi, Omolola
Graduate, Communication

Mentor: Prof. John Baldwin

The purpose of this paper is to explore teachers' perceptions of what motivates students to learn in an online class. The COVID-19 pandemic has further established online teaching in higher education. This change in the teaching mode also involves changing how students are motivated to learn. Through open-ended questionnaires and thematic analysis, the study reveals the strategies that teachers have effectively used to motivate students to learn in their online classrooms. The results also show the challenges teachers experience and the ways they can improve motivation in the online classroom, leading to practical implications for the classroom.

USE OF SOCIAL MEDIA BY THE INTERNATIONAL STUDENTS TO MANAGE STRESS IN THEIR INITIAL DAYS AT UNIVERSITY

Presenter: Rahman, Eshrat
Graduate, Communication

Mentor: Prof. John Baldwin

This study explores how international students use social media to manage their stress during the initial days in the university. The study employed in-depth interviews of seven participants to attain research data. The findings of the study show that the international students primarily use social media to connect with their family members and friends back in their countries, to make new friends in new cultural environment, and to find relaxation and entertainment. Thus, they efficiently manage their stress through their social media usage. However, the participants do not solely depend on social media for stress management as these media sometimes increase stress levels. This suggests that the international students need to socialize in real time which can help them managing stress and better cope with new academic and cultural environments.

Keywords: International students, social media, stress management, university

UNDERGRADUATE STUDENTS' SOCIOECONOMIC STATUS, EMOTIONAL STATE, AND DAILY TASKS WITH SMARTPHONE USAGE

Presenter: Sugimoto, Kaylee
Undergraduate, Communication

Mentor: Prof. Nathan Carpenter

With the ever-growing rise of social media and the evolution of smartphones, the new normal of using and relying on one affects our lives in many ways. From finding new friends to organizing schoolwork, the integration of a smartphone has completely changed the way people think, even compared to ten years ago. Being in college is one of the most transformative and changing times in a person's life. In fact, during the time that a student spends attending college, a study found that about half of the participants displayed profile changes, as well as changes in their ingrained traits, values, and overall personality (Nguyen et al., 2022). Smartphone usage in a college or university environment may correlate with students' socioeconomic status, students' emotional state, and ability to accomplish daily tasks. The study asks the following questions: RQ1: Does a participant's socioeconomic status correlate with different types of smartphone-related activities? RQ2: Does the amount of time a participant spends using their smartphone correlate with their emotional state after using certain types of apps? RQ3: Does the age that a participant reports first using a smartphone affect their ability to do everyday tasks without one? Participants in this study include undergraduate students attending Illinois State University. The study is non-experimental and qualitative and uses results from a participant survey generated from an Honors Contract.

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COMMUNICATION SCIENCES AND DISORDERS

STRONG WOMEN LIVE LONGER

Presenter: Barth, Nicolette
Undergraduate, Communication Sciences and Disorders

Mentor: Prof. Jamie Mahurin-Smith

Authorship: Nicolette Barth

Introduction: The generational and societal pressure for women to become smaller exacerbates the negative-menopausal effects of declining muscle mass and bone density in mid-life women. Sarcopenia, or the gradual loss of muscle mass, strength, and function is associated with an increased risk of disability, frailty, and injurious falls; these risks, in turn, greatly increase the odds of premature death. The purpose of this project is to investigate how low muscle mass and strength in mid-life women affect their morbidity, mortality, and quality of life in the future, as well as to search for evidence-based interventions to prevent and treat sarcopenia and sarcopenic dysphagia. Results: Research shows that in mid-life and menopausal groups, consistent resistance training, a high protein diet, and an adequate intake of vitamin D are seen to effectively treat and prevent the consequences related to low muscle mass and strength. Additionally, the effort to increase overall strength may see to be effective in sarcopenic dysphagia prevention. Discussion: With all the information presented, there needs to be more effort from healthcare professionals to encourage females to incorporate strength training, to live stronger, longer, more fulfilling lives.

SWALLOWING IN A CHILD WITH ZELLWEGER SYNDROME; A CASE STUDY

Presenter: Mutholam, Anjali
Undergraduate, Communication Sciences and Disorders

Mentor: Prof. Taeok Park

Introduction Zellweger Syndrome (ZS) is a genetic disorder found in newborn babies and causes complications with nerves and metabolism soon after birth. Some symptoms of Zellweger syndrome include difficulty feeding, underdeveloped muscles, and movement problems. The purpose of the study was to investigate clinical features of swallowing in a child diagnosed with Zellweger syndrome. Method The subject was a male child of 8 months with Zellweger syndrome born at full term. Videofluoroscopic swallowing exams (VFSE) of thin liquid, thick liquid, and puree were used to analyze the subject. The thin and thick liquid was fed by bottle and puree was fed by spoon. Swallowing was observed including sucking performance, residue, and occurrence of aspiration. Results child performed to suck several times before the swallow. For the thin and thick liquid, there was residue in the vallecula, base of the tongue, and pyriform sinus. The delayed pharyngeal swallow and silent aspiration were observed. Puree swallow resulted in residue at the base of the tongue and vallecula. but the aspiration was not seen. Conclusion We found that puree was safer in terms of airway protection since there was no aspiration involved. Overall, the child has poor sucking performance in oral preparatory and oral stages. This may be related to underdeveloped muscles and movement problems, specifically in the tongue muscles. The child needs swallowing management and treatment to help his development and to maintain his nutrition.

CREATIVE TECHNOLOGIES

SPATIALIZING DIGITAL DRUGS IN VIRTUAL REALITY FOR MENTAL HEALTH

Presenter: Pereira Gloor, Rochele
Graduate, Creative Technologies

Mentor: Prof. Greg Corness

Co-Mentor: Prof. Rose Marshack

Authorship: Rochele Gloor, Greg Corness, Rose Marshack

Virtual reality (VR) is an immersive technology that implies the perception of being physically surrounded by a non-physical world. VR-based therapies for neurological disorders have been in use for nearly two decades and constantly improved with advances in computer graphics technologies. Data from the Global Drug Survey 2021 shows the wide use of digital wellness apps, such as mindfulness meditation in VR and binaural beats, as coping tools for mood disorders during the 2020 pandemic. Listening to “digital drugs” is found to entrain the brain by synchronizing low frequencies to different cognitive states, thus producing a similar effect as psychedelic drug use. Can we use the illusory capacity of high-quality audiovisual experiences in virtual reality, to guide us to self-perception and expansion of consciousness without drugs? Evidence shows the positive impact of VR applications with 3D and binaural audio specially designed for immersiveness and wellness purposes. For this research, I developed an aesthetic mindfulness VR application with 6Hz theta waves drone-inspired soundscape utilizing a state-of-the-art spatialization plugin. The artistic approach to qualitative method is based Francisco Varela’s process for studying the conscious human experience, both phenomenological and meditative. I used first-person method in the spatial audio development. For the second-person method, thirteen acquaintances aged 23 to 57 years old participated in a 10-minute audio relaxation experience wearing high dynamics headphones followed by a 5-minute VR experience in the Oculus Quest 2 headset. The research outcome was positive where 35% of the participants were deeply “moved” by it. Updates on interactions will be considered as will the use of EEG device. Moreover, larger studies with on the use of binaural beats with overlay soundscape for support of mental health treatment are necessary to provide standardized methods and procedures.

CRIMINAL JUSTICE SCIENCES

ATTACHMENT EFFECTS ON BEHAVIOR AND VIOLENCE

Presenter: Vargas, Stephanie
Undergraduate, Criminal justice Sciences

Mentor: Prof. Joanne Savage

Authorship: Stephanie Vargas

Some argue that the most critical period of time for a human being is childhood. Children are extremely dependent on their caregivers. Some developmentalists emphasize the importance of the attachment bond. When a child lacks an attachment to his or her caregiver, it can cause developmental disruptions. It has been argued that when a child lacks to feel an attachment or feels like they're abandoned by to their caregiver it can lead to feelings of chronic stress and fear, as well as mental and behavioral disorders. Research also shows that young children with insecure attachments are at a higher risk of developing behavior problems. In this paper I will examine the literature on the effects of different attachment bonds on child behavior problems. I will also analyze these associations using data from the National Longitudinal Survey of Adolescent Health.

FAMILY AND CONSUMER SCIENCES

ARE ROBOTS THE FUTURE OF THE FASHION INDUSTRY? A CONCEPTUAL FRAMEWORK OF ADOPTION OF APPAREL MANUFACTURING ROBOTS

Presenter: Fisher, Carly
Undergraduate, Family and Consumer Sciences

Mentor: Prof. Christina Soyoung Song

Authorship: Carly Fisher, Christina Soyoung Song

Introduction

While the world is adapting with new technology, apparel manufacturing is continuing with new innovations. Sewbo, announcing the World's First Robotically Sewn Garment, is an early startup in developing automation industrial tools for clothing factories (Staff, R. B. R., & Staff, R. B. R,2018) Jon Zornow, who is the founder of Sewbo, had built the first robot to sew a t-shirt with using no human intervention. Four factors that are affected by the adoption of apparel production are the following, cost efficiency, lead time efficiency, accuracy, and process automation. Apparel manufacturing is defined as the process that clothing and other textiles products are created, this is a global industry, and the production involves multiple steps. (Alibaba Cloud, 2022)

Conceptual Framework

The theoretical foundation for the conceptual model derives from the conceptual framework of the adoption of apparel manufacturing robots. Based on the above analysis, a model integrating cost efficiency, lead time efficiency, accuracy and process automation is proposed to investigate how the adoption of apparel manufacturing robots effects these factors (Figure 1). The model below shows the direct correlation between the adoption of apparel manufacturing robots on cost efficiency lead time efficiency, accuracy, and process automation.

Proposition 1: Cost efficiency positively influences manufacturers' adoption of apparel robots
Proposition 2: Lead time efficiency positively influences manufacturers' adoption of apparel robots

Proposition 3: Accuracy positively influences manufacturers' adoption of apparel robots
Proposition 4: Process automation positively influences manufacturers' adoption of apparel robots

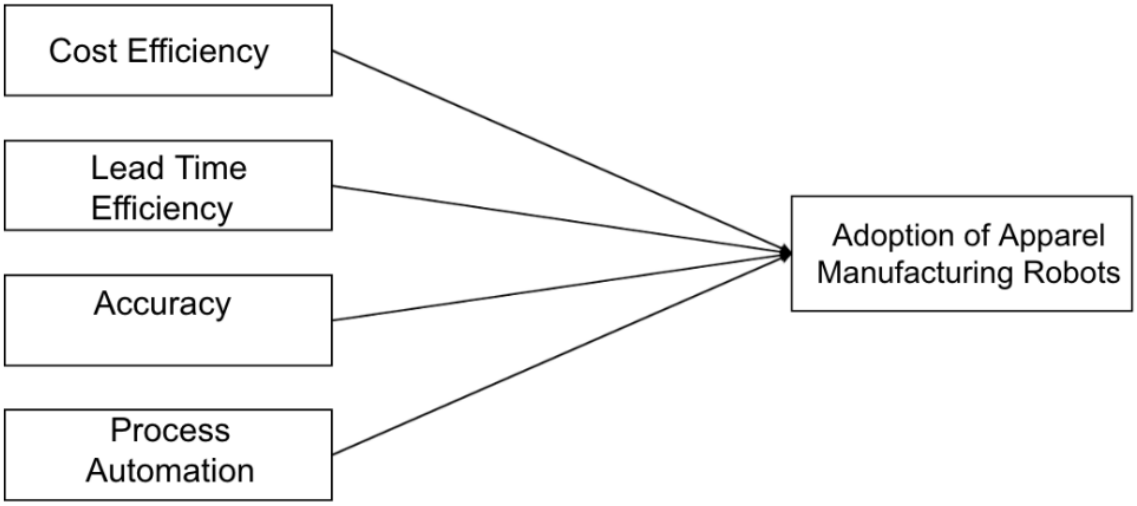

Figure 1. Proposed Framework

Conclusion/Discussion

This study proposes the concept of the adoption of apparel manufacturing robots. The four factors that are affected are cost efficiency, lead time efficiency, accuracy, and process automation. Due to the lack of knowledge and popularization of the concept, not many manufactures have introduced automation into their manufacturing processes. The creation of Sewbo has proved to the industry that garments are able to be produced by a robot and done successfully.

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A CONCEPTUAL FRAMEWORK OF AI SUBSCRIPTION SERVICES: ARE CONSUMERS SATISFIED WITH FASHION SUBSCRIPTION SERVICES?

Presenter: Guzman, Melanie
Undergraduate, Family and Consumer Sciences

Mentor: Prof. Christina Soyoung Song

Authorship: Melanie Guzman, Christina Soyoung song

Introduction:

“Powered by innovative algorithms and curated with expert care, the Wantable experience combines the best of technology and experienced hands-on styling. It’s an art and a science” (Wantable, 2022). Artificial intelligence (AI) has been changing the fashion industry tremendously by performing human tasks to a whole other level of automation. It does so with the use of machines and computers to mirror a human mind's ability to problem-solve and make decisions (Akram et al., 2022). Online fashion subscription services like Stitch Fix, Wantable, and Trunk Club have combined AI with stylists to offer clients customized style recommendations at ease. The combination of technology and human fashion stylist “entails gathering information like preferences, size and budget via style quizzes, as well as from purchases and returns…” (Howland, 2022). This study will focus on the functionality of AI within subscription services and the promotion of consumer satisfaction through AI.

Conceptual Framework:

Based on this information, we proposed our conceptual framework which includes optimized recommendation, enjoyment, personalization, and convenience to conduct an investigation on how they influence consumer satisfaction toward AI subscription services (Figure 1).

Proposition 1. Optimized recommendation positively influences consumers' satisfaction toward AI subscription services.

Proposition 2. Enjoyment positively influences consumer satisfaction toward AI subscription services.

Proposition 3. Personalization positively influences consumer satisfaction.

Proposition 4. Convenience positively satisfies consumers toward AI subscription services.

Conclusion/Discussion:

The fashion industry is rapidly evolving due to the advancement of technology, many brands have incorporated high-tech fashion innovations like Artificial Intelligence to understand the industry and consumers better. This study demonstrates how subscription services have incorporated AI in their business strategy to further business success and promote consumer satisfaction. As the study mentions, businesses have been successful with the combination of AI and humans working together to promote client satisfaction. The study is helpful for online fashion brands wanting to enhance client satisfaction and intensify overall business. Thisanalysis can also influence consumers to consider AI styling subscription services based on the propositions discussed.

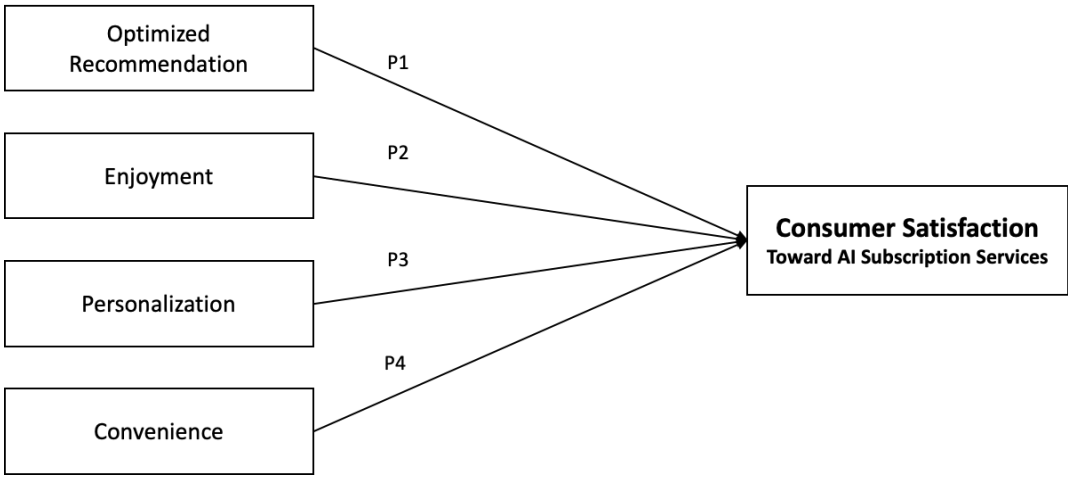

Figure 1. Proposed Framework

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THE FUTURE OF 4D PRINTING TECHNOLOGY IN SHOES: WILL IT BECOME THE MAINSTREAM?

Group Leader: Henning, James
Undergraduate, Family and Consumer Sciences

Group Members: Mira Pedone, Undergraduate, Family and Consumer Sciences; Maddie Castino, Undergraduate, Family and Consumer Sciences

Mentor: Prof. Christina Soyoung Song

Authorship: James Henning, Mira Pedone, Maddie Castino, Christina Soyoung Song

Introduction: 4D printing is a preservative manufacturing process that can reshape and self-assemble with respect to time, money, and materials. A few benefits of 4D printed shoes are that they are formed to the user's foot, and the material is designed to support and flex with the movement of each foot. 4D printing is not only used in the fashion industry, but it is also used by doctors, the aerospace industry, the automobile industry, and biomedical engineers. 4D printing, a part of additive manufacturing technology, shows the capability of fabricating intelligent components through the active design of smart materials and structures, as well as the shapes, properties, or functionalities which can controllably vary with time and space dimensions. This study uncovers the 'how' and 'why' of 4D printing shoes in the fashion industry by developing more research on how it can be more economical and sustainable worldwide.

Conceptual Framework: Based on the above literature, we created our conceptual model of what we believe are the most important reasons for consumers to purchase 4D printed shoes (Figure 1).

Figure 1: Proposed Framework - (Please see attached file)

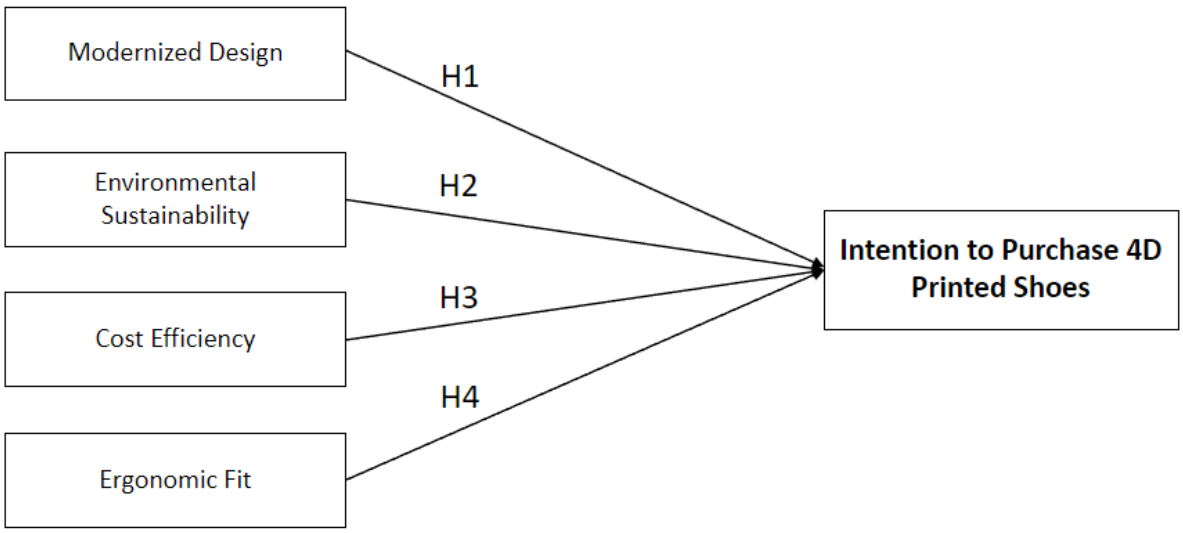

Figure 1: Proposed Framework

Conclusion/Discussion:

After doing the research, this study shows the shoes being not only innovative but environmentally sustainable. There are high hopes for it being seen in fashion in the near future. As complicated as it can be Adidas showed us just how easy it is, it takes two hours to create 4D midsoles. With all the upcoming technology this process can be sped up even quicker. Fashion can have a huge breakthrough with finding a great way of being environmentally friendly. In time it can be used all across the world, changing the way we live and use things. Other companies will start to develop marketing strategies like making them more stylish and finding a way to be sustainable. These findings of the study are going to offer beneficial insights to understanding how and why the fashion industry can change from this.

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INVESTIGATING WRINKLE RESISTANCE OF COTTON AND COTTON BLENDED FABRICS IN RELATION TO A NON-FORMALDEHYDE DURABLE PRESS FINISH

Presenter: Johnson, Miranda
Graduate, Family and Consumer Sciences

Mentor: Prof. Ui-Jeen Yu

Authorship: Miranda Johnson, Ui-Jeen Yu

This study investigated PUREPRESS™-treated cotton fabric's wrinkle resistance, compared to 100% cotton and cotton blended fabrics with/without wrinkle resistance finishes. Wrinkle resistance of cotton fabrics can be achieved by using chemical resin finishes or blending with polyester, nylon, or spandex. Most wrinkle resistant finishes contain harmful chemicals, such as formaldehyde. The PUREPRESS™ technology is a durable press finish through pad, dry, and cure fabric application processes treated with crosslinking resins. These improve wrinkle resistance, formaldehyde-free, making PUREPRESS™ technology a prime alternative to the wrinkle resistance finishes with formaldehyde. Eight different cotton fabric samples were tested in this study—cotton and cotton blended fabrics with PUREPRESS™ technology, wrinkle resistant finish, and no wrinkle resistant finish. The fabric samples were tested using AATCC 128 Wrinkle Recovery of Fabrics: Appearance Method. One-way between groups ANOVAs were conducted to examine how wrinkle resistance differs among fabric samples, depending on fiber type, wrinkle resistant finishes, and PUREPRESS™ technology. *Post-hoc* comparisons using the *Bonferroni* test were also conducted. Results indicated significant differences on wrinkle resistance by the different fiber contents and wrinkle resistance finishes. The 100% cotton fabric with PUREPRESS™ technology showed greater wrinkle resistance than the other fabrics. According to prior research, PUREPRESS™ technology also has other properties, such as abrasion resistance, shape retention, pilling resistance, etc. Further research on these properties is needed to explore characteristics of the PUREPRESS™ technology, compared to other wrinkle resistant fabrics.

CUSTOMER JOURNEY MANAGEMENT IN INDIAN APPAREL MARKETS

Presenter: Kaur, Mankirat
Graduate, Family and Consumer Sciences

Mentor: Prof. Christina Soyoung Song

Authorship: Mankirat Kaur, Christina Soyoung Song

Customer journey management (CJM) starts with understanding customers' experiences throughout their shopping journey (Grewal & Roggeveen, 2020). Small native markets in India can provide memorable experiences for their customers, showing a unique shopping environment with different kinds of noise and fragrances scattered from early morning to late night. The study conducted personal interviews, asking their opinions on price, products, satisfaction level, and apparel shopping experiences among Indian customers. This study found that typical Indian consumers tend to focus on purchasing things they need for daily life, influenced by their cultural factors and frequently bargain the prices of goods actively in the markets. Furthermore, as in other parts of the world, many Indian customers tend to purchase goods online using WhatsApp and Facebook for better prices. Therefore, it has been necessary for Indian retailers and manufacturers to alter shopping processes to leverage the benefits of online businesses. In addition, because foreign brands such as H&M and Zara have entered Indian markets, the sales of local apparel markets have been significantly reduced, and the market has become very comparative (Ho et al., 2019). Therefore, this study recommends that fashion retailers focus on determining and creating a better customer experience by mapping today's changed customer journey in Indian apparel markets.

CASE STUDY OF WRINKLE RESISTANCE WITH PUREPRESS™ COTTON TECHNOLOGY

Group Leader: Loth, Megan
Undergraduate, Family and Consumer Sciences

Group Members: Jess Buhr, Undergraduate, Family and Consumer Sciences; Anna Vonachen, Undergraduate, Family and Consumer Sciences

Mentor: Prof. Ui-Jeen Yu

Authorship: Megan Loth, Jess Buhr, Anna Vonachen, Sofia Orbegozo

The purpose of this study was to examine wrinkle resistance of PUREPRESS™ technology, developed by Cotton Incorporated, in comparison with 100% cotton and cotton blended fabrics with and without wrinkle resistance finishes. PUREPRESS™ technology has a durable press finish, using crosslinking resins to keep fabric wrinkle-free, and reduce loss of strength and abrasion resistance. Different from existing wrinkle resistant finishes, PUREPRESS™ technology does not use formaldehyde. Few studies have investigated PUREPRESS™ technology's wrinkle resistance; hence, this study will fill the gap of literature about wrinkle resistance with PUREPRESS™ technology that uses crosslinking resins through a standard pad, dry, and cure fabric application processes. Researchers conducted AATCC 128 Wrinkle Recovery of Fabrics: Appearance Method and evaluated wrinkle resistance of a 100% cotton fabric with PUREPRESS™ technology in comparison with a 55% cotton 45% polyester blended fabric with wrinkle resistance finish, a 65% polyester 35% cotton blended fabric, and a 100% cotton fabric. Results indicated 100% cotton fabric with PUREPRESS™ technology showed greater wrinkle resistance than the other cotton and cotton blended fabrics with and without wrinkle resistance finish. PUREPRESS™ technology is formaldehyde-free, creating a better alternative to other fabrics with wrinkle-resistant finishes. This study provides an understanding of formaldehyde-free PUREPRESS™ technology and easy-care performance with wrinkle resistance. More extensive research on PUREPRESS™ technology, which improves tensile strength, tear strength, and abrasion resistance is suggested, compared to a conventional durable press finish.

IT'S HAPPENING IN YOUR HOMETOWN: THE WRONGFUL CONVICTIONS OF EVERYDAY PEOPLE

Presenter: Lowe, Megan
Undergraduate, Sociology/ Anthropology

Mentor: Prof. Cristina Prestin-Beard

Authorship: Megan Lowe

The United States hosts a criminal justice system not immune to flaws which victimize everyday people. What factors determine one's path from arrest to incarceration? How can innocent, everyday people be caught up in this process, and how can that ultimately result in imprisonment?

The causes of wrongful conviction are widely agreed to fit into distinct categories. These include official misconduct, eyewitness misidentification, false and coerced confessions, false or misleading evidence, inadequate legal defense, and incentivized witnesses (The Center on Wrongful Convictions, The National Registry of Exonerations, and The Innocence Project). While Illinois law is beginning to address some of these issues, wrongful conviction continues to loom as a danger inseparable from the criminal justice system at present.

Dozens of court cases have secured Illinois residents' exoneration after proving that they suffered incarceration after a wrongful conviction. These wrongful convictions can be mapped across northern, central, and southern Illinois in recent years, providing a great degree of relatability to Illinois State University personnel.

A CONCEPTUAL FRAMEWORK OF CONSUMERS' INTENTION TO PURCHASE 3D KNITTED SHOES

Presenter: Shabani, Nahid
Graduate, Family and Consumer Sciences

Mentor: Prof. Christina Soyoung Song

Authorship: Nahid Shabani, Christina Soyoung Song

Introduction: 3D knitting technology (3DKT) is a relatively new seamless technology that provides inherent stretch and compression properties, reduces nearly 60% of material waste in the production processes, and provides an advantage of personalized shoe fitting (Mahbub et al., 2014). As one of the most advanced innovations in sustainability, 3DKT has been increasingly adopted in the shoe industry (West, 2019; Blaga et al., 2020). However, there is a lack of literature explaining why consumers may want to purchase 3D knitted shoes. Therefore, this study investigates the critical factors influencing consumers' intention to buy 3D knitted shoes and proposes a conceptual framework for 3D knitted shoes.

Conceptual Framework: Based on the above information, we develop the following prepositions and conceptual framework (Figure 1):

Proposition 1: Sustainable product choice will influence consumer intention to purchase 3D knitted shoes.

Proposition 2: Customization of shoe design will influence consumer intention to purchase 3D knitted shoes.

Proposition 3: Shoe comfort will influence consumer intention to purchase 3D knitted shoes.
Proposition 4: Accuracy of shoe fitting will influence consumer intention to purchase 3D knitted shoes.

Proposition 5: Versatility in shoe design will influence consumer intention to purchase 3D knitted shoes.

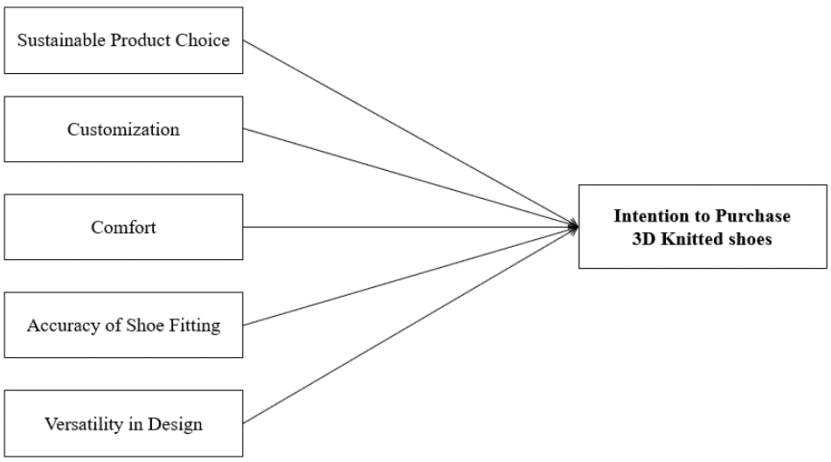

Figure 1. Proposed Conceptual Framework

Conclusion: While seamless knitting technology continues to improve, there are still many technical limitations in 3DKT to achieve functionality and sustainability simultaneously. We hope that our conceptual framework will help 3D knitted shoe companies and manufacturers increase consumers' awareness of sustainable products and be able to promote 3DKT effectively.

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FINANCE, INSURANCE, AND LAW

DETERMINANTS OF LOAN FORGIVENESS IN THE PAYCHECK PROTECTION PROGRAM

Group Leader: Morr, Rudy
Undergraduate, Finance, Insurance, and Law

Group Member: Wyatt Frere, Undergraduate, Economics

Mentor: Prof. Vladimir Kotomin

Authorship: Wyatt Frere, Vladimir Kotomin, Rudy Morr

The Paycheck Protection Program (PPP) extended forgivable loans to small- and medium-sized businesses at the height of the COVID-19 pandemic in the U.S. Certain conditions had to be met and paperwork completed by applicants to ensure loan forgiveness. Using the data set of 11.5 million PPP loans, we analyze how lender and borrower characteristics affect the probability and the speed of loan forgiveness. The loans were risk-free for the lending institutions through which they were extended because they are backed by the federal government. Among the four different types of lenders – community banks, large banks, credit unions, and fintechs – community banks and credit unions are associated with higher forgiveness probabilities and speeds. Among banks, institutions with lower relative costs (a measure of management quality) are associated with the same results. Borrower and loan characteristics associated with higher forgiveness possibilities and speeds include sole proprietorship, White, and female borrowers, as well as small loans.

GEOGRAPHY, GEOLOGY, AND THE ENVIRONMENT

WATER COLOR OF MINNESOTA'S SENTINEL LAKES (SLICE) BY SATELLITE REMOTE SENSING

Presenter: Dooley, Andrew
Graduate, Geography, Geology, and the Environment

Mentor: Prof. Wondy Seyoum

Authorship: Andrew Dooley

Surface waters are preciously vital resources requiring expensive and time intensive labor to effectively monitor for adequate water quality management. New applications of water color analysis by satellite remote sensing are a promising holistic approach to water quality monitoring for scientific, industrial, recreational, and cultural benefit. This research expands previous applications of lake water color analysis and pioneers water color patterns of midcontinent lakes in Minnesota, USA. In documenting lake water color, the first observations of water color homogeneity within ecoregions and color consistency through historical satellite mission data may begin. NASA's Landsat 8 OLI satellite provides an active historical record of visible light reflectance of the Earth's surface. Chromaticity analysis concludes unbiased interpretation of dominant visible wavelength as water color from tristimulus reflectance samples. The Sustaining Lakes In a Changing Environment (SLICE) program, predefines "Sentinel Lakes" representative of the population of lakes within major ecoregions of Minnesota. Visible light reflectance records will be extracted at randomly generated points within Sentinel Lakes at late summer when peak insolation bolsters trophic activity. The expected results of this work will provide groundwork of lake water color distribution and variability across the State of Minnesota. Cartographic representation of Sentinel Lake modal water color will aid in interpretation of water color variability within ecoregions. Graphical displays of modal dominant visible wavelength from each ecoregion will yield quantifiable comparison of water color as wavelength. All Sentinel Lakes within an ecoregion are expected to share consistent water color. Ecoregions are anticipated to possess distinguishable water colors from each other. Chromaticity diagrams of historical water color will display what trends of water color exist and compile ecoregion water color trends since Landsat 8's launch. Individual Sentinel Lake water color trends are hypothesized to not remain a consistent color through time. The results of this project further develops the possibilities of water color analysis for water quality monitoring and surface water management at unprecedented scales. Cost reduction, historical backlogs, and recurrent sampling are few of the major benefits for further scientific investigations with water color methodology for water quality monitoring.

JACKRABBITS OR DESERT COTTON-TAILS?

Presenter: Robinson, Indira
Undergraduate, Geography, Geology, and the Environment

Mentor: Prof. Jonathan Thayn

Authorship: Jonathan Thayn

Early in the Summer of 2022, my faculty mentor traveled to Canyonlands National Park and was surprised to see that the black-tailed jackrabbits (*Lepus californicus*) of his youth have been replaced with desert cotton-tails (*Sylvilagus audubonii*). How is it, that as global temperatures rise, the rabbit species most adapted to arid, dry conditions are being replaced by a seemingly less-fit competitor? To begin to understand the answer to that question, we compared the differences between their preferred habitat using data provided by the Global Biodiversity Information Facility and satellite data provided by the US Geological Survey. Over 12,200 jackrabbit locations and over 22,000 cotton-tail locations were incorporated into a geographically-weighted logistic regression model. The model allows the coefficients associated with each habitat characteristic to vary across space, highlighting the interactions between the characteristics and location. The volume of data, and the complexity of the model, required that we use ISU's High Performance Computing (HPC) facility. The results of this initial model illustrate the differences in the species' preferred habitats and point us in the right direction for future research.

HEALTH SCIENCES

MIXED METHODS STUDY EXPLORING VACCINE SAFETY PERCEPTIONS AMONG COLLEGE STUDENTS

Group Leader: Lemp, Haley
Undergraduate, Health Sciences

Group Member: Josie Trainor, Undergraduate, Health Sciences

Mentor: Prof. Alicia Wodika

Authorship: Haley Lemp, Alicia Wodika, Josie Trainor

Vaccines are considered one of the greatest modern accomplishments of the public health field due to positive health outcomes, such as the decrease in vaccine-preventable morbidity and mortality rates. Vaccine hesitancy can be defined as the refusal to receive, or the delay in the acceptance of, one or more available vaccines. While many factors contribute to this phenomenon, vaccine hesitancy is often related to one's concerns regarding the safety of vaccines. The purpose of this study was to ascertain college students' vaccine safety perceptions and to investigate the subsequent implications for vaccine hesitancy intervention among college students. In Fall 2023, student participants (n=562) completed a mixed-methods Qualtrics survey that contained questions regarding their personal vaccine safety perceptions focused on the COVID-19 Vaccine, the Human Papillomavirus (HPV) Vaccine, the Influenza (Flu) Vaccine, the Tetanus, Diphtheria and Pertussis (Tdap) Vaccine, and the Meningitis Vaccine. Qualitative data analysis included coding the open-ended student responses to detect common themes. Quantitative data analysis utilized descriptive statistics to summarize the results of the closed-ended survey questions. Participants' hesitancy towards the safety of vaccines was highest among the COVID-19 Vaccine, followed by the Influenza Vaccine, and then the Human Papillomavirus Vaccine. Students were less hesitant towards the safety of the Tetanus, Diphtheria and Pertussis (Tdap) Vaccine and the Meningitis Vaccine. Students reported their desire for transparent vaccine safety communication and their distaste for the politicization of vaccines. Additionally, students who were identified as vaccine-hesitant towards one or more of the studied vaccines emphasized the impact of the length of time spent researching a vaccine on their vaccine safety perceptions.

YOU GO, I GO: ASSESSING STUDENT LONELINESS ON CAMPUS

Presenter: Richter, Aubrey
Undergraduate, Health Sciences

Mentor: Prof. Alicia Wodika

Authorship: Aubrey Richter, Alicia Wodika

While on campus and especially during the COVID-19 pandemic, students are susceptible to mental health challenges and prolonged loneliness. Many first year and transfer students struggle to adjust to the lifestyle and environment of college and find their community. During the pandemic, students had access to fewer mental health support resources and due to online classes, were not able to form relationships. Loneliness is one of the largest predictors of depression and suicide and can have negative impacts on a student's health. We aimed to look at the biggest predicting factors of students' loneliness on campus to identify what programs might be most beneficial to enhance student belonginess. We sent out a survey to Illinois State University and Heartland Community College students (N= 632) containing open-ended and multiple-choice questions to assess their level of loneliness and determine their knowledge and suggestions of on-campus programs and interventions. At both ISU and HCC, first year students had higher levels of loneliness as well as students who utilized social media for over 5+ hours per day. Regarding feelings of isolation, 21.6% of the ISU sample and 34.2% of the HCC sample stated they always feel isolated from others. Students reported being aware of student counseling services and registered student organizations but had low familiarity with other resources. Students also reported feeling more motivated to go to events if they had a peer/friend also attending and expressed needing more information about events. Additionally, students stated that their professors could foster community by encouraging group work and getting to know students. Many students indicated that they have moderate levels of loneliness when it comes to feeling in tune with others and forming friendships.

KINESIOLOGY AND RECREATION

THE RELATIONSHIP BETWEEN COMBINE PERFORMANCE AND INJURIES IN NBA ROOKIES

Presenter: Driskell, Nicklaus
Graduate, Kinesiology and Recreation

Mentor: Prof. Kelly Laurson

Injury rates in the National Basketball Association have been steadily climbing over the last 20 years. This has occurred in spite of the number of health and performance staff on each team increasing over this time period. There are more doctors, athletic trainers, performance coaches, and strength and conditioning staff than ever before. It has been hypothesized that a higher amount of specialization in youth sport, heavier and taller athletes, and style of play are all contributing factors to this increasing rate of injury. However, no data currently exists examining the potential link between injuries and performance traits. During the NBA combine, anthropometric and athletic characteristics are measured. These include height, weight, wingspan, vertical jump, body fat percentage, hand size, bench press, agility, and sprint time. Playing time is expected to be the biggest factor correlating with injuries. The purpose of this research was to determine if there is a link between injuries and combine statistics from NBA players' rookie year. We hope to determine if there is any relationship between combine measurements and injuries which could be used to guide training methodologies moving forward.

THE USE OF PHYSICAL ACTIVITY AND STRESS MANAGEMENT EDUCATION FOR IMPACTING HEART RATE VARIABILITY AND STRESS INDEX SCORES

Group Leader: Kuehn, Kelsey
Undergraduate, Kinesiology and Recreation

Group Member: Madison Solomon, Undergraduate, Kinesiology and Recreation

Mentor: Prof. Karen Dennis

Authorship: Kelsey Kuehn, Madison Solomon

PURPOSE: Investigate the relationship between physical activity, stress management education, and other biometric (BM) variables on heart rate variability (HRV) through a course that focuses on teaching healthy lifestyles and stress management education over 16 weeks.

METHODS: Students who were enrolled in KNR 113 Personal Fitness at Illinois State University during the fall of 2022 were subjects for the study. Throughout the 16-weeks, students participated in physical activities that targeted improving fitness, that were measured through pre- and post-testing. Additionally, KNR 113 students were given university provided pedometers and self-reported their steps weekly. Step counts from week 4 (pre) and 14 (post) were averaged. HRV measurements were gathered at both pre- and post-testing using the HeartMath emWave Pro software measured by a pulse plethysmograph ear sensor along with BM data (ht, wt, body comp., VO2 (1-mile walk test)) and SI (State-Trait Anxiety Inventory for Adults, Polar Tri-Fit software). Weekly “Release It’ assignments were given through the HeartMath Institute website to focus on teaching students how to implement breathing techniques, attitude, and heart-brain connection in their own lives.

RESULTS:

Paired samples T-tests were utilized to assess differences between pre- and post-tests. While there was an increase in HRV, it was not statistically significant ($t(51)=-1.070$, $p=.290$), or for SI scores ($t(62)= -0.529$, $p=.599$). Statistical significance was found in VO2 ($t(68)= -12.292$, $p=.001$) and steps ($t(47)=-2.965$, $p=.005$). Cohen’s effect size values for VO2 ($d= -1.480$) suggest a “very large” practical significance in VO2 values.

CONCLUSION: The study found a statistically significance improvement in fitness levels (VO2) between pre- and post-testing although no statistical significance between HRV and Stress Index measurements. While the HRV and Stress Index measurements did not show any improvements, it is notable that an increase in physical activity and stress management tools can and may be useful to help better manage stress, SI and increase HRV.

USER-CENTERED APPROACH TO INTERACTIVE MAPPING: A CASE STUDY OF DISTRICT 87'S COMMUNITY WELLNESS RESOURCES

Presenter: Mueller, Zachary
Graduate, Kinesiology and Recreation

Mentor: Prof. Nicky Wu

Co-Mentor: Prof. John Kostelnick, Geography, Geology, and the Environment

Authorship: Zachary Mueller, Nicky Wu, John Kostelnick, Emily Jones

Diversity, equity, inclusion, and belongingness are topics of utmost importance in today's society. In recent years, there has been a push to reach the needs of underserved, marginalized populations who are underfunded and have limited resources. Due to a lack of funding and limited resources, school districts are forced to deal with the impacts of inequities in access and accessibility of community resources that promote physical activity, health, and emotional well-being. School District 87, located in Bloomington, IL, is one of the many school districts facing these challenges. Our current interactive map displays the location of community assets: public/private institutions, physical spaces, businesses, and groups/organizations, as well as the walkability time in five-minute intervals from each school to show access and accessibility to community resources. The interactive map was created in 2019 and includes outdated data and is in need of an update. This project aims to create a more functional interactive map that enables staff members to be more effective at promoting physical activity, health, and emotional well-being. Following a user-centered design process, this project utilizes a two-step approach of two rounds of needs assessments to ensure that the map meets the needs of the staff members. The initial needs assessment consists of a survey with both quantitative Likert-type scale answers and qualitative-open ended answers. The second round of needs assessment consists of 25-minute individual zoom interviews. Zoom interview and its screen share tool allow us to understand how participants interact with the map and gather detailed user feedback about the usability and functionality of the map. It is anticipated that we will identify additional map features, functions, and data layers that will increase staff usage of the map. Furthermore, it is anticipated that we will identify barriers that will prevent map usage, such as the potential lack of knowledge, terminology, and experience using interactive maps. Our project goals are to give district staff members a more intuitive and functional asset map that meets their needs, increase map usage, identify new assets within the community, and increase staff member knowledge on how to use our interactive map properly.

EQUITY, DIVERSITY, & INCLUSION EXPERIENCES OF FEMALE PROFESSIONALS IN THE SPORTS & RECREATION INDUSTRY

Presenter: Oloffson, Kayla
Graduate, Kinesiology and Recreation

Mentor: Prof. Mike Mulvaney

College athletic departments provide opportunities for young adults to participate in competitive sports at a high level. The successful management and operations of collegiate athletics relies heavily on well-trained professionals to support these services. Historically, college athletics has been viewed as a male-dominated field. However, female professionals are slowly breaking through and increasing in numbers during the past 30-50 years. A recognized initiative that has helped support this growth has been the increased focus on diversity, equity, and inclusion (DEI) efforts within college athletics. The purpose of this study was to explore DEI efforts and their impact across college athletic programs of various sizes. More specifically, the similarities and differences between Division I and Division III female administrators and their perceptions of DEI-related efforts were examined. Female administrators from Division I and Division III collegiate athletic programs were recruited for the project. Each of the administrators recruited for the project were recognized as contributors to their athletic department's goal of raising awareness of DEI and how it can be further executed to narrow the gap between males and females in athletics. Qualitative (structured) interviews were conducted with each of the administrators and thematic analyses were employed to identify repeated patterns and themes. The results of these analyses are highlighted and discussed.

RRIERS TO PHYSICAL ACTIVITY IN UNIVERSITY STUDENTS FOLLOWING PARTICIPATION IN EXERCISE IS MEDICINE ON CAMPUS

Group Leader: Rafael, Julia
Graduate, Kinesiology and Recreation

Group Member: Sarah Lafayette, Graduate, Kinesiology and Recreation

Mentor: Prof. Kristen Lagally

Authorship: Sarah LaFayette, Julia Rafael

PURPOSE: The purpose was to examine barriers to being physically active before and after participation in Illinois State University's Exercise is Medicine on Campus (EIMOC) program. METHODS: Forty-one participants completed a 20-item questionnaire prior to and after participating in the EIMOC program. The questionnaire included the "Barriers to Being Active" quiz and an assessment of stage of change for physical activity participation. RESULTS: Pre- and post-participation stage of change and barrier mean scores are included below. For stage of change, a decrease in the value indicates greater participation in physical activity. For barriers, a score over 5 is considered an important barrier, and a decrease in the value indicates that the barrier has become less significant. Paired t-tests indicated significant differences ($p < 0.007$) between pre- and post-program stage of change and in all barriers except Lack of Time, Fear of Injury and Lack of Resources.

Stage of Change

n=41) Lack of Time

(n=38) Social Influence

(n=39) Lack of Energy

(n=38) Lack of Willpower

(n=38) Fear of Injury

(n=39) Lack of Skill

(n=39) Lack of Resources (n=38)

Pre 2.9 4.3 4.8 5.3 6.8 1.0 2. Post 2.4 4.1 3.8 4.1 4.6 0.7

CONCLUSION: Reductions in barriers to physical activity is positive for promoting participation and adherence to physical activity. The results suggest that following EIMOC program participation, physical activity levels were better (as assessed by stage of change), and participants experienced a reduction in major barriers. Additionally, all barriers were under a score of "5" following the EIMOC program. These results support the EIMOC program as a positive physical activity intervention.

EFFECTS OF BALL WEIGHT ON ELBOW JOINT KINETICS IN BASEBALL PITCHING

Presenter: Wood, Kyle
Graduate, Kinesiology and Recreation

Mentor: Prof. Michael Torry

Authorship: Kyle Wood, Hiroshi Sagawa, Michael Torry

INTRODUCTION: Weighted baseball throwing programs are often used to increase pitch velocity. However, increased injury risk has been reported and questions regarding possible mechanism of injury at the elbow exist. Analysis of elbow joint reaction force and moments during pitching of multiple ball weights may provide insight on injury potential. PURPOSE: To compare the effects of weighted baseballs on elbow joint kinetics during pitching.

METHODS: 10 baseball pitchers (Age 13.3 ± 2.69 years) were analyzed in the study. Participants threw 5 pitches with 5oz, 7oz, and 9oz baseballs. Ball weight order were counterbalanced and 3 fastest pitches for strikes were analyzed. Full body, 3D segment position data were collected using a motion capture system (200 Hz). 3D marker trajectories were input into a Visual 3D model to estimate elbow joint moments and reaction forces. Varus elbow joint moment and joint reaction forces were compared with RMANOVA ($\alpha = .05$) and Bonferroni post-hoc tests.

RESULTS: Differences were noted between the ball weights on pitch velocity (5oz 16.7 ± 3.2 m/s, 7oz 15.99 ± 3.1 m/s, 9 oz 15.2 ± 2.7 m/s, $p<0.017$) and elbow extension velocity (5oz 3905.1± 434.6 dg/s, 7oz 3474.4 ± 419.7 dg/s, 9oz 3260.2 ± 428.7 dg/s, $p<0.05$). Throwing heavier balls resulted in a decreased compression force between the 5oz and 7oz, as well as 5oz and 9oz, but not between 7oz and 9oz (5oz 451.6 ± 172.1N, 7oz 391.6 ± 163.2N, 9oz 381.9 ± 174.2N, $p< 0.017$). The Varus moment decreased as ball weight increased and only exhibited significant differences between two of the conditions (5oz 29.1 ± 15.3 Nm, 9oz 25.1 ± 8.2 Nm, $p<0.017$). Lateral and Medial JRF differences were not significant.

CONCLUSION: Increased ball weights caused a decrease in pitch and elbow extension velocity, as well as compressive JRF and varus moment at the elbow. The decrease in elbow joint moment and forces could be caused by the decrease in ball velocity. The results suggest that throwing weighted baseballs do not increase the risk of injury to the elbow in youth pitchers.

MATHEMATICS

TRAINING A VIRTUAL SPIDER

Group Leader: Beyer, Daniel
Undergraduate, Mathematics

Group Member: Joseph Wittrock, Undergraduate, Mathematics

Mentor: Prof. Mehdi Karimi

Authorship: Joseph Wittrock, Daniel Beyer

Reinforcement Learning (RL) is a popular branch of machine learning with several modern applications which enables an agent to learn in an interactive environment. Deep RL (combinations of RL and Neural Networks (NN)) has made major breakthroughs in robotics in recent years. In this project, we use deep RL and the Unity platform to program and design a physically simulated spider. We use Unity's Machine Learning Agents package and PyTorch to train the spider to complete certain tasks. The tasks include following an object, navigating difficult terrains, and climbing surfaces. As part of this project, we define the environment, action space, and reward function. Using Unity ML agents lets us define our deep RL agents with the ability to make observations (to collect data), to make decisions based on observations, to take an action mapped to that decision, and to collect a reward from the consequences of that action. The agent's interaction with the environment creates the training data for the deep RL agent to find an optimal policy. Observations include the spider's limb positions and velocities and the position of the target object. Observations can also include ray casts that act as the eyes of the agent. The agent's actions will control the forces on the joints of the spider's legs.

In this project, we also study some of the theoretical aspects of RL such as the Bellman and the Q-learning equations to find the best deep RL agent type. After trying the default agents PPO and SAC available in the Unity package, we investigate other options in the literature that can improve the training process. We optimize hyper-parameters such as batch size, learning rate, and epsilon to train the spider more efficiently and effectively. Our results and techniques can be used for training more complicated robots with advanced abilities.

CLASSIFYING FLOWERS USING CONVOLUTIONAL NEURAL NETWORKS ON A TENSOR PROCESSING UNIT

Group Leader: Soltermann, Christian
Undergraduate, Mathematics

Group Member: Christiana Beard, Undergraduate, Mathematics

Mentor: Prof. Mehdi Karimi

Authorship: Christian Soltermann, Christiana Beard

Computer vision has tremendously improved in recent years due to advancements in Neural Networks (NN), specifically, a sub-class of them called Convolutional Neural Networks (CNNs). CNNs are designed to automatically learn a hierarchy of two-dimensional filters that operate on visual data, preserving the spatial relationships within the image. Image classification, one of the primary problems in computer vision, utilizes NN and Deep Learning to recognize and categorize visual data into pre-defined classes automatically. Our research primarily explores the application of CNNs to the classification of images of flowers. A flower image dataset was acquired from the Kaggle “Petals to the Metal - Flower Classification on TPU” competition. Our research will also focus on using Tensor Processor Units (TPUs), integrated circuits developed by Google for neural network machine learning, as well as TensorFlow, a deep learning package used with the Python programming language. We explore and study several new techniques in image classification, such as Data Augmentation and Attention, to improve the performance of our models, which will be primarily measured using scores obtained from submissions to the Kaggle competition. Our developed techniques can be used for flower image classification and many other applications.

MUSIC

AN EXAMINATION OF THE RELATIONSHIP BETWEEN COMPOSER DAVID MASLANKA AND THE ILLINOIS STATE UNIVERSITY SCHOOL OF MUSIC

Presenter: Whitman, Scott
Graduate, Music

Mentor: Prof. Phillip Hash

Authorship: Scott Whitman

The purpose of this study was to examine the extent of composer David Maslanka's collaboration, engagement, interactions, and connection with the Illinois State University School of Music. Research questions will examine the following: (a) What was the nature of the relationship between Maslanka and the students and faculty at ISU? (b) What outcomes resulted in the relationship between Maslanka and the ISU School of Music? To date, no study has addressed the relationship with this composer and the ISU. Ensembles at ISU continue to perform his pieces to this day, and he remains an influential figure in the School of Music.

Dr. David Maslanka (1943-2017) was a world-renowned composer. He received his doctorate in music theory and composition from Michigan State University in 1971. He taught and lectured at four universities until 1990 when he moved to Missoula, Montana to be a full-time freelance composer. Maslanka's lifetime of composing resulted in more than 150 pieces. Over a third of those are for wind ensemble. He wrote eight symphonies, 17 concertos, a Mass, and many additional pieces for concert ensembles. His body of work also includes many chamber pieces, as well as works for orchestra and choir.

The Illinois State University School of Music Programs archive allowed for an analysis of the performances of Maslanka's pieces by ISU ensembles and faculty. The concert programs show that over 3 decades, in addition to frequently performing his works, the ISU Wind Symphony did five world premier performances of new Maslanka pieces, and an ISU School of Music faculty member premiered another. With a relationship spanning more than 30 years and including over 57 performances of his works at over 50 concerts, 10 visits to ISU's campus, eight different ISU conductors of his work, and six world premier performances of his work, it seems accurate to state that David Maslanka's influence on the Illinois State University School of Music, specifically the Band Department, has been substantial. This study shows that a long-standing collaboration between an educational institution and a composer is possible and can create a lasting impact on the school or university involved.

PHILOSOPHY

THE ETHOS OF ABSENCE

Presenter: O'Dowd, Sara
Undergraduate, Philosophy

Mentor: Prof. Daniel Breyer

Authorship: Sara O'Dowd

Rhetoric is often examined as presence and words, as the art of speaking tends to. That focus often minimizes the role that silence, and absence can play in rhetoric. Silence and physical absence have grown as tools of rhetoric, allowing for movements to gain ground in the political sphere or hold space for new voices at the table in seminars. These tools tend to be most purposefully wielded by those on the margins, as those in power inadvertently pushed them into their hands. This rhetoric has grown to be more powerful and better documented with time, but it often is used by those on the margins and is not recognized for the act that it is. This study explores how silence and absence came to this state and works to understand better how they function when held in light of Aristotle's model of rhetoric.

PHYSICS

BIO-INSPIRED RESERVOIR COMPUTING TO PREDICT NEURONAL BEHAVIOR

Presenter: McGinnis, Cassie
Undergraduate, Physics

Mentor: Prof. Epaminondas Rosa

Co-Mentor: Prof. Rosangela Follmann, Information Technology

Authorship: Cassie McGinnis, Rosangela Follmann, Epaminondas Rosa

Neuronal behavior can be difficult to predict, especially in the case of pathological activity which may exhibit chaotic patterns. Being able to anticipate what a neurological system will do next is of extreme relevance for the treatment of neurological disorders as epilepsy and Parkinson's disease, among others. Recent advances in computational capability offer important opportunities for using reservoir computing in machine learning to make reliable predictions in neuronal activity. Given the complexity of the problem, this remains an elusive target, but new approaches are showing promising results. In this study we show results using three different network topologies in the context of machine learning in order to find an optimal tool for neuronal predictability, in addition to a more realistic model, a network topology base on the known connectome of the nematode C. elegans. It consists of a total of 302 neurons with all connections mapped out. Our analysis for optimized prediction incorporates the adjustment of a variety of control parameters including the reservoir size, the probability of forming edges, the number of edges in each node, and the regularization constant. The reservoir performance for different topologies is quantified using training and predictive error analysis.

MATHEMATICAL MODELING OF C. ELEGANS' THERMOTAXIS ASSOCIATED WITH CALCIUM DYNAMICS

Group Leader: Retter, Julia
Undergraduate, Physics

Group Members: Dylan Chambers, Undergraduate, Physics; Lylia Gomez, Undergraduate, Physics

Mentor: Prof. Epaminondas Rosa

Co-Mentor: Prof. Rosangela Follmann, Information Technology

In this work we present results of numerical computer simulations about the dynamical mechanisms underlying thermoreception in the nematode C. elegans. The mathematical equations we use contain Arrhenius temperature factors accounting for the thermotaxis of the animal seeking environments with temperatures more amenable to their survival. Our mathematical model mimics the behavior of the amphid finger-like ciliated (AFD) neurons and replicate, with a good level of accuracy, data output from equivalent experimental settings. These include the AFD's calcium dynamics response when exposed to linearly ramping as well as oscillatory temperature stimuli. Typical behavioral time scales encountered in our mathematical model are consistent with experimental peak times for calcium responses during pulse-like temperature inputs.

POLITICS AND GOVERNMENT

ONE HOMELESS HERO IS TOO MANY: HOPELESS TO HOMELESS TO HIRED TO HOUSING. ELIMINATING HOUSING INSECURITY BY GETTING THE RIGHT JOB AND THE RIGHT JOB TRAINING TO THE RIGHT VETERAN

Presenter: Walsh, Jeffrey
Graduate, Politics and Government

Mentor: Prof. Carl Palmer

Co-Mentor: Prof. Kevin Kline, Military Science

On any given day, in the land of the free and the home of the brave and in the world's richest country, 1 in 4 Americans who experience chronic homelessness and housing insecurities are Veterans. Unfortunately, government initiatives from previous administrations have not directly addressed the root causes of veteran homelessness and veteran unemployment, merely throwing money at the problem. However, homelessness in the veteran population is preventable. America's heroes return from combat zones from all corners of the globe trained as tankers, infantrymen, and artillerymen only to find no equivalent job in the civilian labor market leading directly to unemployment and housing insecurity.

With the proper active-duty job/career training and their wealth of knowledge and experience, America's veterans can significantly contribute to the American GDP and workforce. If we can use their skills appropriately in the 21st Century civilian workplace, we would likely see a significant reduction in veteran homelessness. Skillbridge is one program designed to address military skillset insecurities. The Department of Defense program Skillbridge is a military employment initiative started in 2014 open to all military branches that provides 180 internships in a variety of civilian job fields. The soldier, sailor, Airman, Marine or Coast Guard personnel is allowed to participate in this program just before they separate from the service at discretion of their respective unit commanders. I will explore both the qualitative and quantitative aspects of Skillbridge to ascertain how well the program is working overall in helping eliminate job insecurity.

In this study, I examine how the types of transferrable job skills post 9-11 veterans received during training affect their housing insecurity and homelessness once they return stateside. For my research methods, I have chosen a multi-method approach. My dependent variables are veterans' housing insecurity and homelessness. My independent variable is transferrable military job skills. My control variables are Army combat arms veterans, PTSD, income, education, gender, and age. I use surveys and the quantitative method to test my hypothesis. I use deductive reasoning and specific research questions to learn about military job training and military jobs held by post 9-11 soldiers who rank E-1 to E-4 while on active duty. Finally, I rely on qualitative interviews of officials at the Department of Veterans Affairs regarding any trends, patterns, and insights regarding veteran job insecurity and veteran housing insecurity. All of America's displaced veterans deserve the opportunity to go from hopeless to homeless to hired to housing.

PSYCHOLOGY

AWE AND POSITIVE AFFECT: THE ROLE OF SELF-TRANSCENDENCE AND SELF-FOCUSED ATTENTION

Presenter: Chall, Autumn
Graduate, Psychology

Mentor: Prof. Jef Kahn

Authorship: Autumn Chall, Jef Kahn

Problem or Major Purpose

The experience of awe, such as seeing a sunset from atop a mountain, is associated with positive emotion (Anderson et al., 2018; Nelson-Coffey et al., 2019). Yet the mechanisms through which awe leads to positive emotion are poorly understood. One way to induce awe is through writing about a prior awe-inducing experience (Bai et al., 2017). The purpose of this study was to use a brief writing task to (a) confirm the relationship between writing-induced awe and positive affect and (b) investigate two theory-based mediators of that relationship—a reduction in self-focused attention and greater self-transcendence (e.g., Jiang & Sedikides, 2021).

Procedure

College students (N = 241) completed this study online. This between-subjects design had participants complete a measure of positive affect (Watson et al., 1988) and then write (in a text box) about either a personal experience of awe or a neutral experience (i.e., something typical that they did fairly recently). Following this, participants filled out questionnaires assessing post-writing positive affect, subjective feeling of awe (Bai et al., 2017), self-focused attention (Woody, 1996), and self-transcendence (Jiang et al., 2018).

Results

The manipulation check indicated that participants instructed to write about awe reported significantly higher subjective feelings of awe than the control condition, $t(238) = 7.27$, $p < .001$. Additionally, after controlling for pre-writing positive affect, participants in the awe condition reported higher post-writing positive affect than those in the control condition, $\Delta R2 = .01$, $F(1, 238) = 4.00$, $p = .047$. The relationship between writing condition and post-writing positive affect was not mediated by self-transcendence, indirect effect = .18 (95% C.I. = −.06, .49), nor self-focused attention, indirect effect = −.02 (95% C.I. = −.16, .06). As Figure 1 illustrates, however, self-transcendence was positively related to post-writing positive affect.

Conclusions and Implications

This study provided additional evidence that writing about awe experiences has the potential to induce awe and increase momentary positive affect (see Bai et al., 2017). We did not find evidence that the relationship between awe and positive affect is mediated by self-focused

attention and self-transcendent experiences, however; thus, the mechanism of awe's effect on emotion remains elusive. One implication of this research is increased support of the effectiveness of writing about awe experiences as a method of inducing awe and positive affect. Future research may address the potential of writing about awe in a therapeutic context.

CAN VIDEO COMPARISON FACILITATE CHILDREN'S STEM LEARNING?

Group Leader: Colwell, Alexis
Graduate, Psychology

Group Members: Dennis Gromov, Undergraduate, Psychology; Abby Wissler, Undergraduate, Psychology

Mentor: Prof. Alycia Hund

Authorship: Alexis Colwell, Dennis Gromov, Abby Wissler

Providing opportunities for STEM engagement throughout childhood is necessary to attract more individuals to STEM careers and meet the U.S. labor demand in STEM fields. The goal of the current study is to examine the effectiveness of a video comparison activity in teaching 6- and 7-year-old children an engineering principle: that a diagonal brace provides stability in structures. This study is a replication and extension of Hoyos and Gentner (2017), and it is completed entirely online. Children were randomly assigned to one of three groups: Comparison, Single Model, or No Training. The children in the Comparison group saw two metal towers in a training video. In the video, a researcher pushed on the towers to demonstrate that one is stable (diagonal brace tower), and one is unstable (horizontal crosspiece tower). Children in the Single Model group saw a video of the one stable tower. Children in the Comparison and Single Model groups were asked to explain why the diagonally braced tower is strong. Children assigned to the No Training group did not see any training videos nor were they asked to explain them. All three groups completed (a) a Relational Reasoning task, (b) a transfer task, and (c) a Mental Transformation task. The Relational Reasoning and Mental Transformation tasks assessed children's spatial skills, and the transfer task assessed whether children could apply the diagonal bracing principle demonstrated in the training videos in a different situation. Parents provided details about children's science, technology, engineering, and mathematics (STEM) interest and spatial language to examine the relation of these constructs with performance on the three child tasks. We expected that children in the Comparison group would produce more brace-based (referencing the diagonal brace) explanations than children in the Single Model group after watching the training videos. On the transfer task, we predicted that children in the Comparison group would perform better than both the Single Model and No Training groups. We expected children's performance on all three tasks to be positively correlated with STEM interest and spatial language. The expected findings would highlight the importance of early STEM exposure by demonstrating associations between children's STEM interest and spatial language use and their performance on the spatial tasks. The results would also provide support for including opportunities for comparison and explanation in online learning activities.

EFFECTS OF ATTENTION AND DELAY ON FALSE MEMORIES FOR STEREOTYPES

Group Leader: Corea-Dubon, Maria
Graduate, Psychology

Group Member: Taylor Humphrey, Undergraduate, Psychology

Mentor: Prof. Dawn McBride

Authorship: Maria Corea-Dubon, Taylor Humphrey

Previous research has shown that memories get distorted when people are presented with stereotype-consistent information (Macrae et. al, 2002). The purpose of this study was to examine the effect of stereotype exposure on the generation of false memories for Latino and White individuals. In this experiment, a total of 40 faces (half Latino and half White) were paired with one of two job titles: “Construction Worker" or “Software Developer”, which represented stereotype-consistent or stereotype-inconsistent pairings for each race. Participants were instructed to study the faces and job pairings for a later recognition test. Participants were randomly assigned to one of two attention conditions. In the undivided attention condition, they were exposed to the pairings with no distractors. In the divided attention condition, participants were exposed to the pairings while listening to an audiobook, and were asked to be attentive to both the stimuli on screen and the audio. In the recognition test, participants were presented with a mixture of studied and unstudied faces. They pressed “Old” if they remembered the face on screen and then indicated the occupation paired with the face. Participants pressed “New” if they did not remember the face on screen. To assess the effect of delay on memory performance, a second recognition test took place seven days later.

We expect a higher rate of false memories for the divided attention condition, because of reliance on stereotype-consistent information when cognitive resources are limited. However, after a delay of seven days, participants will produce higher rates of false memories, regardless of their attention condition, as a result of memory decay. The Fuzzy-Trace theory of memory offers insights on our findings, as gist-based memory processes could explain memory errors after exposure to stereotypes.

TRANSFER OF LEARNING IN PERCEPTION WITH HAPTIC SENSORY-SUBSTITUTION DEVICES

Presenter: Duffin, Tyler
Graduate, Psychology

Mentor: Prof. Jeffrey B. Wagman

Authorship: Tyler Duffrin, Jeffrey B. Wagman

Studies have shown that perceiving a given property of a wielded object requires task-specific sensitivity to the patterns of mechanical stimulation that support perceiving that property. The same is true for perceiving properties of the environment by means of a wielded object. Recently, studies using the Enactive Torch—a novel sensory-substitution device—have shown that these mechanical stimulation patterns are invariant across medium (Favela et al., 2018; 2021). The current study used a transfer of recalibration paradigm to investigate the extent to which this is the case. We investigated transfer of recalibration to the invariant patterns of mechanical stimulation that support perceiving surface distance by means of a wooden rod and by means of an Enactive Torch. In a pre-test and post-test, participants used each of these modalities to explore an occluded surface and reported the perceived distance of that surface. In the practice session, we manipulated which modality participants used to perform this task and whether feedback about performance was provided. We found that transfer of recalibration occurred with feedback regardless of practice modality. The results will be discussed in the context of the invariant stimulation patterns that support perceiving and acting.

CAN I.D.E.A. MESSAGING BE TRUSTED? EVALUATION OF AN ACADEMIC INTERVENTION

Presenter: Hicks, Travis
Graduate, Psychology

Mentor: Prof. Jordan Arellanes

Authorship: Tavis Hicks, Jordan Arellanes, Eric Wesselmann

Problem

The BDT framework of interpersonal trust (Rotenberg, 2010) conceptualizes and assesses trust as consisting of 3 bases (honesty, emotion, reliability). The 3 bases are defined accordingly: 1) honesty is defined as a person telling the truth and engaging in behaviors that are benign and genuine in intention as opposed to being malicious or manipulative; 2) emotional trust is defined as a person refraining from causing emotional harm, which can take the form of criticism, embarrassment, or breaking confidentiality; 3) reliability refers to a person fulfilling their word and promise. Limited research has utilized this model to analyze the trust relationships between minority university students and university faculty and administration.

Procedure

From 2020-2022, twelve classes from a multidisciplinary project (N = 65) utilized a SoTL academic intervention focused on inclusion, diversity, equity, and action (IDEA). Focus groups were conducted in each class and BDT was utilized as a conceptual framework to guide the subsequent thematic analysis. Participants were asked questions related to the instructors/administrators' actions, the campus/community climate, and belongingness. Member checks were conducted to support the validity of the study.

Results

Themes aligned closely with the three bases of trust in the BDT framework. 1) Honesty of IDEA intentions- - Initial recruiting messages focusing on IDEA were revered, but when actions did not match these messages, students interpreted them as performative and tokenistic rather than genuine actions of inclusion; especially when confronted with discrimination and prejudice. 2) Emotional associations with trust- Students expected IDEA classes to be community spaces for sharing their experiences about race and the university. When students felt this sense of community, they were more likely to disclose personal experiences. Unfortunately, not all students had such an experience, within the class or university. 3) Reliability of IDEA messaging- When students disclosed experiences of discrimination or prejudice, they expected faculty and administration to validate their experiences. When this occurred, trust improved. When responses left students feeling invalidated or unfulfilled, they shared that faculty and administration were unreliable. Overwhelmingly, sincerity and follow-through contributed to students' trust of faculty and administration.

Conclusions

Limited research has applied the BDT framework directly to feelings of trust held by students toward university faculty and administration. We highlight how university faculty and administration can take steps toward fostering trust by demonstrating sincerity (honesty), being

open and non-judgmental to students' disclosures (emotional trust) and acting in accordance with students' expectations of support (reliability).

IS COPING ENOUGH? EXAMINING COPING ON BURNOUT AMONG EDUCATORS

Presenter: Jezowit, Caitlyn
Graduate, Psychology

Mentor: Prof. Adena Meyers

Authorship: Caitlyn Jezowit, Adena Meyers

Coronavirus-19 added additional job demands for educators. Research has yet to examine teachers' perceptions of job characteristics in the context of undergoing years of the pandemic and how educators cope and experience workplace demands. This study explored the associations between the impact of COVID-19, job demands and resources, and coping with burnout symptoms and turnover intentions among teachers. The findings are informative for administrators and school districts to support educators during this time.

DOES UNIMANUAL HAND-PREFERENCE MEDIATE OR MODERATE THE RELATION BETWEEN ACQUISITION AND ROLE-DIFFERENTIATED BIMANUAL HAND-PREFERENCE?

Group Leader: Kroehnke, Megan
Undergraduate, Psychology

Group Member: Ashton Henry, Undergraduate, Psychology

Mentor: Prof. Julie Campbell

Authorship: Megan Kroehnke, Ashton Henry, Julie Campbell, George F. Michel

Hand preference in infancy has been proposed as a developmentally cascading factor which denotes earlier established behaviors having impact on later developed ones (Michel, 2021). Varying factors of hand-preference have shown this pattern from infancy to toddlerhood. Hand-preference for acquisition, for example, in infancy has been shown to impact the behavior of role-differentiated bimanual hand-preference (RDBM) later on in toddlerhood (Nelson et al., 2013). To explore this relation, unimanual hand-preference has been identified as a skill developing in between the aforementioned behaviors. Occurring consistently early in infancy, a hand-preference for this skill has also been observed (Campbell, 2015). Upon further research, a relationship has been discovered between the factors of unimanual hand-preference and acquisition during ages 6-14 months (Campbell et al., 2015). More research on the nature of the mechanism, driving this cascade, is needed. The purpose of this study is to explore further what is occurring between these factors by identifying if unimanual hand-preference mediates or moderates the relation between acquisition and role-differentiated bimanual hand-preference. Ninety infants were assessed (6-14 mo.) for acquisition, unimanual, and RDBM hand preference. Infants were presented with objects to manipulate while seated at a large table. Videos of the sessions were coded for the hand used when manipulating the objects. The next phase of this study will be to conduct a mediation and moderation analysis to determine whether unimanual hand preference mediates or moderate the relation between acquisition and RDBM hand preference. Data is currently all collected and initial data cleaning has been completed. Future results of this study will determine the role of infant unimanual hand preference in mediating or moderating the relationship between acquisition and RDBM hand preference during the toddler stage. Following the analysis and interpretation, results are anticipated to be completed in a couple of months. This study describes the cascade of hand preference for one skill in infancy into a hand preference for RDBM in toddlerhood. While interpretations are yet to be completed, the implications of this study will describe the mechanism that influences how unimanual hand preference cascades into lateralized hand preference for RDBM.

MEDIA REPRESENTATION (AND LACK OF) AS SOCIAL INCLUSION AND EXCLUSION

Group Leader: Lim, Zhi Quan
Graduate, Psychology

Group Member: Travis Hicks, Graduate, Psychology

Mentor: Prof. Eric D. Wesselmann

Co-Mentor: Prof. Jordan A. Arellanes

Authorship: Zhi Quan Lim, Eric D. Wesselmann, Jordan A. Arellanes, Travis Hicks

There have been increased discussions about the importance of having diverse representation in media (e.g., Film and TV shows). Media research predominantly focuses on the effects of positive versus negative depictions of individuals from different identity groups. The prevailing assumption is that a lack of representation is worse than negative representation, yet this is not conclusive. This assertion converges with research on interpersonal social exclusion, which demonstrates that negative attention, feeling invisible, or unworthy of attention is harmful. We hypothesize that media representation can be experienced similarly to interpersonal forms of social inclusion, and a lack of representation can be experienced similarly to social exclusion/ostracism.

We conducted two online experiments. In both studies, participants first listed an identity category important to their self-concept. Then, participants engaged in an adapted autobiographical recall paradigm. In Study 1, participants were randomly assigned to one of three groups. Group one recalled a time when someone who shared their identity category was represented in media (type of representation purposefully left ambiguous). Group two recalled a time in which a someone who shared their identity category was noticeably absent in media. Group three served as the control condition, writing about an unrelated event. In Study 2, participants were randomly assigned either to the control condition, the absence condition, or to an interpersonal exclusion condition (i.e., someone purposefully excluded you from an event because of your social group). Participants in both studies completed measures of perceived social value, feelings of being ignored/excluded, and basic psychological need satisfaction (e.g., self-esteem).

In Study 1, participants recalled feeling higher perceived value when they saw their identity group represented than the control or absence condition; there was no difference between the absence condition and control. Participants recalled feeling more ignored/excluded and lower basic need satisfaction when their identity group was absent than both the control and representation conditions. Results for Study 2 were mixed. Participants in the exclusion condition felt the most ignored/excluded, followed by participants in the absence condition and then finally the control condition. Participants in the exclusion condition recalled feeling higher value than the absence group, and descriptively (though not significantly) less than the control condition. Participants in the exclusion condition felt less basic need satisfaction when excluded than both the absence and control conditions. There was no difference between the control and absence condition on basic need satisfaction, contrary to Study 1.

GUIDED EXAMINATION REVIEWS IN HIGHER EDUCATION: A LOOK AT KAHOOT! AND JEOPARDY

Presenter: Lomelino, Tori
Undergraduate, Psychology

Mentor: Prof. Dawn McBride

Authorship: Tori Lomelino

The current study investigates the effectiveness of and perceptions surrounding two common online educational platforms used for examination review sessions in higher education: Kahoot! and Jeopardy. All participants are currently taking a psychology research methods course and will be invited to review sessions before their upcoming exams. The review session for their first exam will be demonstrated using Kahoot! and participants will answer multiple-choice questions related to the material on their first exam independently, like a practice test. The review session for their second exam will be demonstrated using Jeopardy and participants will work in teams to answer questions related to the material on their second exam quickly and correctly, like a trivia game. Participants will answer questions on a survey using a Likert scale regarding their perceptions of the two review sessions (i.e., confidence, feeling prepared, helpfulness). Participants' exam scores will be collected and analyzed to determine the effectiveness of the review sessions. Based on previous findings, it is predicted that students who attend the review sessions will perform better on the exam than students who do not. It is also predicted that students will prefer the Kahoot! review over the Jeopardy review but students are expected to score similarly on the exams after both review sessions.

Keywords: examination reviews, online platforms, educational games

OUT-OF-HOME PLACEMENTS, SUBSTANCE USE, AND PARENTAL INCARCERATION. WHAT IT MEANS FOR JUVENILES SUCCESSFULLY COMPLETING PROBATION

Presenter: Mahoney, Megan
Undergraduate, Psychology

Mentor: Prof. Adena Meyers

Authorship: Megan Mahoney, Farhia Osman, Kalysa Pampuch, Blake Tennent, Adena Meyers

The purpose of this study is to examine the probability of juvenile offenders successfully completing probation based on out-of-home placements, substance use, and parental incarceration. Minors who grow up in dysfunctional households are more likely to repeat the dysfunctional family patterns when they become adults (Gomis-Pomares et al., 2021). This study is based on an ongoing project involving coding and analyzing probation and court records from the juvenile justice system that derived out of a rural county in Illinois. Variables from these records will be used to analyze the primary research question.

ASSESSING EDUCATOR NEEDS TO PROMOTE WELL-BEING

Presenter: McKinley, Jessica
Graduate, Psychology

Mentor: Prof. Adena Meyers

Authorship: Jessica McKinley, Adena Meyers, Caitlyn Jezowit, Derek Goebel, Katie Rokusek, Megan Kroehnke

Educator stress and well-being have become increasingly important areas of research as educator attrition and shortages have affected schools throughout the United States and across the world. The onset of the COVID-19 pandemic added new stressors and exacerbated existing challenges. The purpose of the current study was to hear directly from educators to learn more about their experiences with stress, the challenges they face in education today, and the ways in which their well-being can be improved. This grounded theory qualitative study included three focus groups and two individual interviews with educators in a Midwestern elementary school district. Using the constant comparative method of analysis, three challenges and three recommendations for improvement were generated with the overarching theme focused on the need to promote an autonomy-supportive climate for educators in order to improve well-being.

Keywords: educator stress, well-being, grounded theory, autonomy support

ORTHOREXIA NERVOSA: THE ROLES OF ATTACHMENT AND PSYCHOLOGICAL NEEDS

Group Leader: McLarty, Allie
Undergraduate, Psychology

Group Member: Estrella Gomez Hernandez, Graduate, Psychology

Mentor: Prof. Suejung Han

Authorship: Allie McLarty, Estrella Gomez Hernandez, Suejung Han

Problem: Orthorexia Nervosa (ON) is defined as an excessive obsession with only eating foods that are deemed healthy (Barrada & Roncero, 2018). Despite recent scholarly efforts, it still remains unclear whether ON may constitute a clinical disturbance and is a separate eating disorder entity distinctive of other eating disorders (e.g., anorexia nervosa). Recent studies have shown that some general psychological risk factors for eating disorders (i.e., anorexia nervosa, bulimia nervosa, binge eating disorder) are also associated with ON, including perfectionism, obsessive-compulsive symptoms, and negative affect (Barrada and Roncero, 2018). Other risk factors for eating disorders, specifically, emotional regulation difficulties, psychological need thwart, and attachment insecurity have yet to be examined in relation to ON. Significant and yet differential association patterns between these factors and ON may clarify the construct validity of ON as a distinctive eating disturbance. It is reasonable to speculate that ON may be a suppressive effort for difficult emotions and compensatory efforts for thwarted psychological needs, similar to restricted eating in anorexia nervosa. However, given more extreme control over not only how much but also 'what you can eat' of ON, ON may be more strongly associated with attachment avoidance (i.e., more suppressive controlling effort) than attachment anxiety, unlike restricted eating that is associated with both attachment insecurities (Han & Kahn, 2017). We hypothesized that ON would be associated positively with emotion regulation difficulties, psychological need thwart, and attachment avoidance (vs. anxiety).

Procedure: Female-identified college students (N=191, data collection in progress, mean age=19.3, 82% White) in a U.S. Midwestern university participated in an online survey for research participation credits. The survey included the Experiences in Close Relationship-Short Form (Wei et al., 2005), the Difficulties in Emotion Regulation-short form (Kaufman et al., 2015), the Psychological Needs Thwart Scale (Bartholomew et al., 2011), and the Teruel Orthorexia Scale (Barrada & Roncero, 2018).

Results: A multiple regression analysis result supported the hypothesis partially, $R = .46$, $R2 = .21$, $F (4, 176) = 11.57$, $p < .001$. As predicted, thwarted psychological needs ($\beta = .29$, $p < .001$) and attachment avoidance ($\beta = .15$, $p = .05$) predicted ON significantly. Attachment anxiety ($\beta = -.05$, $p = .50$) or emotion regulation difficulties ($\beta = .29$, $p = .09$) did not.

Implications: ON may serve as distress avoidance/suppression (i.e., attachment avoidance) and compensation for thwarted psychological needs. ON may be an eating disturbance that is distinctive from anorexic restricted eating.

LONGITUDINAL ASSOCIATIONS BETWEEN FAMILY SUPPORT AND ADOLESCENTS' SELF-PERCEPTION

Group Leader: Meister, Rachel
Undergraduate, Psychology

Group Members: Will Dettmann, Graduate, Psychology; Andie Baker, Graduate, Psychology

Mentor: Prof. Laura Finan

Authorship: Rachel Meister, Andie Baker, Will Dettmann, Laura J. Finan, Christine M Ohannessian

Purpose: Adolescents are tasked with figuring out their identity and integrating their sense of self (Dunkel, 2017). Given their salience as developmental contexts, families may play a crucial role in this process. Positive family interactions are associated with a range of developmental and adjustment outcomes, including adolescents' emotional well-being (Xiang, et. al, 2020) and lower externalizing behaviors (Ryan et al., 2010). It is not surprising then that research also indicates that family functioning, cohesion, and support may bolster adolescents' self-concept and clarity (Johnson, Galambos, Krahn, 2021). However, extant examinations of adolescent's self-perceptions are narrow in focus as they do not examine the ways family relationship factors are associated with the diverse range of self-perception domains and are generally limited to cross-sectional samples. Therefore, we examined how family support is associated with how adolescents see themselves across domains, over time.

Method: Data were drawn from the Predictors of Anxiety and Depression During Adolescence (PANDA) Project (Ohannessian & Vannucci, 2018), which surveyed adolescents from five Northeastern State middle schools every six months starting fall 2016 (Mage=12.75; SD=.71; 51% female). Data from the current study were drawn from the Spring 2019 (T1) and Fall 2020 (T2) waves, when participants were in middle adolescence. The Self-Perception Profile for Adolescents (Wichstrom, 1995) was used to assess adolescents' self-perception across the following domains: academic, social acceptance, athletic, physical appearance, behavioral conduct, close friendship, global self-worth, and body image dissatisfaction. The Multidimensional Scale of Perceived Social Support (Zimet et al., 1990) scale was used to assess support from families (α=.91).

Results: Separate linear regression analyses were used to examine longitudinal associations between family support (T1) and each self-perception domain (T2), controlling for previous wave self-perception domain, age, and gender (T1). Family support was positively associated with academic (b=.07, p<.01), social acceptance (b=.05, p<.01), athletic (b=.06, p<.01), behavioral conduct (b=.04, p<.05), and close friendship (b=.10, p<.001) self-perception domains. However, family support was only marginally associated with body image dissatisfaction (b=-.04, p<.06) and physical appearance (b=.04, p=.06), and not associated with global self-worth (b=.03, p=.18). Discussion: These findings highlight the importance of positive family interactions on adolescents' development of their view of self across diverse self-perception domains. Given that self-perception is an important correlate of adolescent adjustment outcome (e.g., depressive symptoms; AlGhamdi et al., 2011), our findings may aid programs aimed at supporting adolescents' self-exploration by working with families to positively impact their well-being.

CREATING SAFE SPACES: A COMMUNITY-BASED ART MURAL PROJECT

Group Leader: Meister, Rachel
Undergraduate, Psychology

Group Member: Michaela Hayes, Graduate, Psychology

Mentor: Prof. Laura J. Finan

Authorship: Rachel Meister, Michaela Hayes, Laura J. Finan

Research suggests youths' active engagement in the arts is associated with positive outcomes ranging from enhanced communication skills and opportunities to self-confidence and self-esteem (French, 2018; Gussak & Ploumis-Devick, 2004; Hughes et al., 2005; Phillips, 2012; National Endowment for the Arts, 2020). Some research even suggests that the benefits of engagement with arts during adolescence extend into adulthood (e.g., problem solving; Phillips, 2012). However, outside of some research on older adults (Cohen et al., 2007) there is a dearth of research examining how community youth group-based mural art contributes to social and adjustment outcomes. Therefore, we investigated how participation in a community-based mural art program was associated with how youths think about their future and their impact on the community.

In July 2022, a two-week community-based art mural project was conducted. The project aimed to provide a platform for young artists to reflect on "Creating Safe Spaces" in a small mid-western town. Young artists (N=41) recruited from local schools, community centers, and nonprofits joined police officers and community members in creating a public mural (entitled "Journey of Hope"). Participants worked on the mural for 3-4 hours daily and participated in daily activities and discussions. Quantitative data were collected via pre- and post-mural surveys. Only 26 youth attended the mural project and assented to participate in the research, but two were excluded due to age and consent issues (N = 24 for the pre-test, N = 17 for the post-test). The participants (Mage=12.96, SD=1.43; 54.2% female; 33.3% multi-racial/-ethnic) completed both pre- and post-test surveys which assessed demographic information, their levels of hope (Synder, 1997) and their civic efficacy (Syvertsen, 2015).

Mean values were computed for scales and paired samples t-tests were conducted to examine differences in study variables from before and after participating in the mural. Hope scores were not significantly different from before (M=23.53, SD=5.96) to after (M=23.65, SD=6.43) the mural, $t(16)=.09$, $p=.93$. Similarly, civic efficacy scores were not significantly different from before (M=3.61, SD=.47) to after (M=3.12, SD=.25) the mural, $t(16)=1.87$, $p=.08$.

We did not find statically significant evidence that engagement in a community group-based mural art program was associated with differences in youths hope for the future or civic efficacy. However, given the small sample size, it may be that the current study was underpowered to observe such effects. Future research is needed to understand the ways in which engagement in these types of programs impact young people.

CHOSEN STEPPING-STONE CONFIGURATIONS DEPEND ON TASK CONSTRAINTS

Presenter: Orthy, Maisha Tahsin
Graduate, Psychology

Mentor: Prof. Jeffrey B. Wagman

Authorship: Maisha Tahsin Orthy, Jeffrey B. Wagman

Previous research investigating how people choose to arrange stepping stones in a play area has shown that people create non-symmetric patterns that differ from those typically found in playgrounds. In this study, we investigated how people choose to arrange stepping stones when creating a path from one place to another and how these choices between different conditions. Participants used small circular rubber mats to create a walking path to cross a 600 cm space as carefully as possible, as comfortably as possible, and as quickly as possible. After making each path, participants walked on and adjusted the mats if necessary. The result showed that participants used fewer mats, placed them farther apart, and created greater challenge (distance of mats in relations to stepping distance) when crossing the space quickly than in the other two conditions. These results will be discussed in relation to perceiving and creating affordances.

MESOSYSTEMIC INFLUENCES ON JUVENILE JUSTICE OUTCOMES

Presenter: Osman, Farhia
Graduate, Psychology

Mentor: Prof. Adena Myers

Authorship: Farhia Osman, Megan Mahoney, Eric Marchand, Kalysa Pampuch, Blake Tennent, Adena Meyers

According to ecological theory research, the microsystem is the direct relationships and immediate surroundings of an individual (e.g., family, school). And the mesosystem is the interactions between the various microsystems of an individual (Newman and Newman, 2020). Applying ecological theory to the juvenile justice system, the interactions between the family, the school system, the court and probation system, etc. are all part of the youth offender's mesosystemic influences. Research and professionals involved within the juvenile justice system universally acknowledge that family and parental involvement is a protective factor for youth offenders (Burke, et al., 2014; Mallett, 2010; Schwalbe, 2012). Probation officers describe positive parental support as a partnership in care for the child, and emphasize uncooperative parents undermine youth participation and success in final outcome (Schwalbe, 2012). However, there is a lack of clarity upon how to quantify and measure family engagement (Schwalbe, 2012). This research operationalizes family engagement through the frequency of contact between the family and juvenile justice professionals. And it will utilize this definition to explore the relationship between family involvement and probation outcomes, and thus, mesosystemic influences upon the youth offender’s final disposition.

This research utilizes archival data records of low-risk juvenile offenders from a rural, Midwestern county. The researchers were granted access of court and probation records from the years 2010 to 2015 as part of a larger initiative, and systematically reviewed and coded the information for analysis. The variables of interest were the frequency of contact (i.e., total contacts, family-initiated contacts, and professional-initiated contacts) and the final probation outcome. The researcher also will control for length of time within the system.

A chi-square test of analysis was conducted on a smaller sample of 44 participants to determine the relationship between frequency of contact and the final probation outcome. However, the researcher plans to analyze a larger number of participants using regression models to determine if the number of contacts predicts the outcome. It is hypothesized that frequency of family-initiated contact will significantly predict an outcome of successfully discharged or dismissed.

The results of this study will add to the literature by providing an operationalization of family engagement within the juvenile justice system. It also highlights the communication between the probation system and family through the language of ecological theory, and the mesosystemic influences of the youth offender upon their probation outcome.

DIFFERENCES IN EXPOSURE TO RACIAL MICROAGGRESSIONS FOR BLACK PWI AND HBCU COLLEGE STUDENTS

Presenter: Peterson, Kierra
Graduate, Psychology

Mentor: Prof. Brea Banks

Authorship: Kierra Peterson, Brea Banks

The purpose of this proposed poster is to present the results of our research examining differences in exposure to racial microaggressions among Black college students enrolled at Predominantly White Institutions (PWIs) and those enrolled at Historically Black College and Universities (HBCUs). Microaggression are brief and commonplace daily verbal, behavioral, or environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative racial slights and insults toward people of color (Sue et al., 2007). Research suggests that racial microaggressions cause considerable psychological distress among Black Americans and are manifested in nearly all interracial encounters (Sue et al., 2008). Using a quantitative methodology, we are surveying Black students currently enrolled at PWIs and HBCUs. The survey specifically includes items to assess demographic variables (i.e., race, age, sex, year in school), frequency of exposure to microaggressions, and racial centrality. We hypothesize that the prevalence of racial microaggressions experienced by Black PWI students will be higher than those experienced by Black HBCU students, given that PWIs have more white individuals on their campuses who may be more likely to engage in microaggressive behavior. We are also exploring how participants' report of racial centrality impacts their report of exposure to racial microaggressions. Some research suggests that higher reports of centrality are related to greater endorsement of discrimination, but no studies have explored how this may differ for Black students at HBCUs as opposed to PWIs. We hope that the results of our study will provide insight into how students experience higher education, depending on the demographic and culture of their schools, which may help to promote safe and supportive school environments and initiate equitable practices for all students.

THE DEVELOPMENT OF CARDINAL, ORDINAL, AND SPATIAL LANGUAGE IN YOUNG CHILDREN

Group Leader: Powell, Autumn
Undergraduate, Psychology

Group Members: Mahika Charles, Undergraduate, Psychology; Alexis Colwell, Graduate, Psychology; Kaila Jones, Undergraduate, Psychology; Katie Kastar, Undergraduate, Psychology; Emily Monroe, Undergraduate, Psychology; Hope Mueller, Undergraduate, Psychology; Kimberly Perez, Undergraduate, Psychology; Caitlyn Weber, Undergraduate, Psychology; Abby Wissler, Undergraduate, Psychology; Seungok Yum, Graduate, Psychology

Mentor: Prof. Alycia Hund

Authorship: Mahika Charles, Alexis Colwell, Kaila Jones, Katie Kastar, Emily Monroe, Hope Mueller, Kimberly Perez, Autumn Powell, Caitlyn Weber, Abby Wissler, Seungok Yum

Language is an important aspect of child development. Cardinal number words such as one, two, and three emerge before ordinal number words such as first, second, and third, although both increase in early childhood (Colome & Noel, 2012). Similarly, spatial words such as front, middle, and back, improve from 3 years to 5 years and help with problem solving skills (Hund et al., 2017). A recent study compared ordinal and spatial language and found that 3- and 4-year-old children were significantly less successful at a search task using ordinal labels than using color labels, and their performance with spatial labels was intermediate (Hund et al., 2021). Our goal was to investigate the developmental trajectory of cardinal, ordinal, and spatial language comprehension and production from 3 to 5 years. Thus far, 158 3-, 4-, and 5-year-old children have been tested using cardinal (one, two, three), ordinal (first, third, fifth), and spatial (front, middle, back) labels, presented in a counterbalanced order. Children were randomly assigned to the Give Me or Tell Me condition. In the Give Me condition, children were asked to place the appropriate car(s) into a toy garage based on the label provided by the researcher to test language comprehension. In the Tell Me condition, children were asked to produce the correct label specified by the researcher. Analyses revealed significant developmental improvements from ages 3 to 4 years and 4 to 5 years. Children were significantly more accurate in the Give Me condition than the Tell Me condition, suggesting that comprehension outpaces production. Children were significantly more accurate on trials involving cardinal labels than trials with spatial labels, and significantly more accurate with spatial labels than ordinal labels. These findings provide important details about the development of relative language during early childhood, which has implications for academic success in mathematics and beyond.

EVALUATING THE GOLD STAR MISSION, PART 2: FOCUS GROUP RESULTS

Presenter:	Ryner, Lilly Graduate, Psychology
Mentor:	Prof. Eros Desouza
Co-Mentor:	Prof. Mark Swerdlik
Authorship:	Lilly Ryner, Katie Little, Eros Desouza, Mark Swerdlik

This study was designed to be a part of a broader program evaluation of the Gold Star Mission (GSM). GSM is an organization founded to “honor and support Gold Star Families by preserving the memory of our Fallen Heroes through service to others in need”.

Focus groups were held with participants of the Gold Star 500 an annual endurance cycling event which honors service members who gave their lives while actively serving in the military and raises funds for college scholarships for their dependents. The focus groups were designed as a follow-up to the results of a previous online survey. Focus group questions were centered around an evaluation of the various GSM organizational goals and objectives; assessing the impact of GSM events on participants; and gathering information to plan for future activities to better support Gold Star Families and honor the fallen.

In the current study, researchers conducted two focus groups with a total of 19 participants, all were recruited form the cycling event. The six focus group questions included: (1) In what ways is the Gold Star Mission effective in increasing awareness of the significance of the phrase Gold Star Family? (2) How can Gold Star Mission better facilitate community support for its members? (3) How has your involvement in the Gold Star Mission event helped you be better emotionally, physically, and or spiritually? (4) What effects have the Gold Start Mission activities had on other people that you know? (5) In what ways has participating in Gold Star Mission events made you feel supported? and (6) Share a specific example of when you felt understood, accepted, or experienced camaraderie by participating in Gold Star Mission events. A qualitative analysis was conducted coding participant responses into main themes. The frequency of main themes ranged from 4 to 5 for each question. Themes included outreach to communities, grief and emotional support, and memorialization. Results suggested that the Gold Star Mission was reaching its goals and objectives and held events that were impactful on participants. Themes also centered around the need to reach more Gold Star Families; GSM could do more to involve younger people and focus group participants expressed a strong desire for GSM to sponsor more events.

ATTACHMENT STYLE AND STUDENT ACADEMIC SUCCESS

Presenter: Shaw, Kyler
Undergraduate, Psychology

Mentor: Prof. Dawn McBride

Authorship: Kyler Shaw

John Bowlby's theory of attachment has targeted the association between infant attachment and future social interactions (Bowlby, 1989). Further expansion of Bowlby's theory has led to predictions of social interactions in adulthood (Fleming, 2008). The present study focused on the relationship between attachment styles and the academic success of college students. It was hypothesized students who reported a secure attachment style had greater academic success compared to students who reported insecure attachment styles. Participants were presented a survey that illustrated descriptions of both secure and insecure attachment styles and asked to rate how likely they identified to them. Results showed securely attached students had higher academic performance compared to insecurely attached students.

AFFECT AND OUTCOME EXPECTATIONS AS DETERMINANTS OF ACADEMIC MAJOR SATISFACTION

Presenter: Strain, Audrey
Undergraduate, Psychology

Mentor: Prof. Margaret Nauta

Authorship: Margaret Nauta, Kathryn Skoog, Audrey Strain, Karolina Wierzbicka

Problem or Purpose: College students' satisfaction with their choice of major predicts their academic performance (McIlveen et al., 2013), persistence (Suhre et al., 2007), and well-being (Pesch et al., 2018). Uncovering major satisfaction's determinants would help with the early identification of students who are at risk for negative outcomes so if a change of majors is warranted, it occurs early enough for a timely graduation. Recent research (Lehman & Nauta, 2022) revealed affect experienced in classes predicts major satisfaction, and the association was strongest among first-year students. Consistent with the Social Cognitive Model of Career Self-Management (Lent & Brown, 2013), we hypothesized that students' beliefs about what will happen in the future if they earn a degree in their major (i.e., academic-major outcome expectations) also determine major satisfaction. We believed outcome expectations may be especially salient for advanced students, whose thoughts may be increasingly about post-college life.

Procedure: Students (N = 260; 87% female; 34% racial minority) completed an online survey consisting of the Positive and Negative Affect Scale (Watson et al., 1988) with instructions to respond with respect to how they felt in major-related classes, the Academic Major Satisfaction Scale (Nauta, 2007), and a new outcome expectations measure we developed based on a separate sample's (N = 25) responses to open-ended questions about what will happen in the future if they earn a degree in their major.

Results: A regression analysis confirmed outcome expectations are related to major satisfaction. Major satisfaction's bivariate associations with positive affect (r = .34) and negative affect (r = -.35) were both significant and aligned with Lehman and Nauta's (2022) findings, but the association between positive affect and major satisfaction was not significant when controlling for outcome expectations. Year in school moderated the association between positive outcome expectations and major satisfaction, but contrary to our expectation, the association weakened as year in school increased.

Conclusions and Implications: Outcome expectations hold promise as an avenue for identifying and intervening with students who are at risk for negative academic outcomes related to low major satisfaction, particularly early in college. The value of assessing both outcome expectations and affect is less clear, as there appears to be redundancy between outcome expectations and positive affect. There are still unanswered questions about the determinants of major satisfaction among more advanced students.

EDUCATIONAL EXCLUSION AND ACHIEVEMENT: WHAT THAT MEANS FOR JUVENILES IN THE JUSTICE SYSTEM

Presenter: Tennent, Blake
Undergraduate, Psychology

Mentor: Prof. Adena Meyers

Authorship: Blake Tennent, Megan Mahoney, Farhia Osman, Kalysa Pampuch, Adena Meyers

The aim of this study is to explore and describe the educational outcomes among juveniles within the justice system. This study relied on court and paper probation logs, rather than human participants. A judge in a rural Illinois county, who oversees the juvenile court, allowed us to examine cases of individuals under the age of 18 from 2010 to 2015. Throughout this study, we have worked to code and analyze records into specifically defined variables. The key variables examined in this study include in-school suspensions, out-of-school suspensions, expulsions, the beginning level of academic achievement, and the end level of academic achievement. Analyses will be conducted to explore the relations among these variables. The discussion will focus on how school exclusion shapes one's end level educational achievement within the juvenile justice system.

MICROAGGRESSION PERCEPTIONS AMONG BLACK WOMEN AND MEN

Group Leader: Towner, Jazsmine
Graduate, Psychology

Group Members: Jessica Akpan, Graduate, Psychology; Arielle Flint, Graduate, Psychology; Tyra Jackson, Graduate, Psychology; Farhia Osman, Graduate, Psychology; Brittany Bradley, Graduate, Psychology

Mentor: Prof. Brea Banks

Authorship: Brea Banks, Jazsmine Towner, Jessica Akpan, Arielle Flint, Tyra Jackson, Brittany Bradley, Farhia Osman

Racial microaggressions are verbal, behavioral, or environmental slights that often communicate hostile and derogatory messages towards People of Color (Sue et al., 2008). Whether intentional or unintentional, racial microaggressions often result in deleterious effects on one's physiological, psychological, and emotional functioning (Smith et al., 2007; Nadal et al., 2014; Keefe et al., 2014). Specifically, chronic exposure to microaggressions has been linked to the presentation of traumatic stress symptoms, reduced-self efficacy, increased headaches, and fatigue in Black individuals (Moody & Lewis, 2019; Smith et al., 2007; Helms et al., 2011). Examples of racial microaggressions as experienced by Black women and men include being perceived as less intelligent, the assumption of criminality, and the act of tokenism (i.e., the assumption that one Black person speaks for all) in predominately white spaces. Additionally, Black women are often perceived as being loud, angry, and hypersexual, while Black men, regardless of physical characteristics, are more likely to be perceived as larger and more threatening than their racial counterparts.

Currently, there exists limited research examining whether there are significant differences in the perceptions of microaggressions for Black women as compared to Black men. Conceivably, Black women may interpret microaggressions as more harmful given that their intersectionality of race and gender may make these transgressions more salient. Using an online survey, we are examining how Black participants' exposure to microaggressions, gender-blindness, color blindness, and acceptability of microaggressions are related and if there exist differences given gender. Data collection is underway and will be completed by the end of October. Upon completion of the survey, participants will be entered into a raffle to receive a gift card. This study may be especially relevant for the field of school psychology as Black professionals are often susceptible to microaggressions in the workplace.

REFLECTIONS OF MICROAGGRESSIONS IN HIGH-SCHOOL, SCHOOL ANXIETY, AND SCHOOL CLIMATE

Presenter: Towner, Jazsmine
Graduate, Psychology

Mentor: Prof. Brea Banks

Authorship: Jazsmine Towner, Brea Banks

We examined college students' reflections of racial microaggressions in high school and school anxiety and the role that perceptions of school climate play as a moderator of those reports. Microaggressions are everyday interpersonal slights that are enacted against people holding minoritized identities such as race, gender, sexuality, and religion (Sue et al., 2007). Our focus for the current study was racial microaggressions and particularly those that are experienced in high school. We were interested in exploring the impact of microaggressions on school-based anxiety, given the unique experiences of adolescents in high school. School climate refers to the thoughts and feelings an individual has about their school environment (Cohen et al., 2009). We hypothesized that 1) exposure to microaggressions would predict school anxiety, such that participants who reported more exposure to microaggressions would report higher school anxiety, and 2) the relation between exposure to microaggressions and school anxiety would be moderated by school climate, as the relation between exposure to microaggressions and school anxiety would be weaker for those endorsing positive perceptions of school climate. We recruited 113 college students (ages 15-72) who held racially minoritized identities and via a Qualtrics survey asked them to reflect on their high school experiences. Our hypothesis was partially supported, as exposure to microaggressions significantly predicted generalized anxiety but did not predict social anxiety We did not find support for our hypotheses that school climate would moderate this relation.

PRECRASTINATION AS A FORM OF INTENTION OFFLOADING: A TEST OF THE CLEAR HYPOTHESIS

Group Leader: Williams, Courtney
Undergraduate, Psychology

Group Members: Cody Casteel, Undergraduate, Psychology; Connor Al-Ashkar, Undergraduate, Psychology

Mentor: Prof. Dawn McBride

Authorship: Ryan Liew, Connor Al-Ashkar, Cody Casteel, Courtney Williams

Cognitive offloading is defined as an act to reduce one's mental processing demands by taking a physical action (e.g., setting a reminder on your phone or writing a note to yourself). The present study looks at how precrastination is related to cognitive offloading. VonderHaar et al. (2019) defines precrastination as the tendency to complete a task early even at the expense of extra effort. Recent research has looked at the CLEAR hypothesis, which states that there is a strong drive to reduce one's cognitive load (VonderHaar et al., 2019). When presented with two tasks, a person tends to cognitively offload by completing the more cognitively demanding task first. Gilbert et al. (2020) found there to be a strong bias in participants' use of external cognitive tools as opposed to internal resources. In the current study, participants will be given a prospective memory task of hitting a specific key in the box moving task when a certain numbered box is due to be moved. We will consider their offloading choices in trials where they get to choose to offload or not (earning more points for remembering without the reminder). They will also do a standard box moving task in a different block of trials to measure their precrastination of the item generation task. Our hypothesis is that participants's precrastination rates should be related to their choices in the offloading task, which would support the CLEAR hypothesis.

LONGITUDINAL ASSOCIATIONS BETWEEN PEER RELATIONSHIPS AND ADOLESCENT E-CIGARETTE USE

Presenter: Worden, Kara
Undergraduate, Psychology

Mentor: Prof. Laura Finan

Authorship: Kara Worden, Ali Fay, Kenzie Wiegel, Laura Finan, Christine Ohannessian, Symphany Mitchell

Purpose: Given that one in five high school students and one in twenty middle school students currently use e-cigarettes (Wang et al., 2020), it is essential to understand the factors associated with use. One factor that may contribute to this health risk behavior is relationships with peers. Studies suggest that the presence of bullying victimization (negative experience/stimuli) could result in maladaptive coping patterns, such as substance use (Agnew,1992; Peck et al., 2018). In contrast, research shows that peer social support results in lower rates of adverse adjustment outcomes, including substance abuse (Wills, 2020). However, how these peer factors contribute toe-cigarette use remains understudied. Therefore, we examined the relationships between peer victimization and support and adolescents' e-cigarette use.Method: Data were drawn from the Predictors of Anxiety and Depression During Adolescence (PANDA) Project(Ohannessian & Vannucci, 2018), which surveyed adolescents from five Northeastern State middle schools every sixmonths starting in the fall of 2016 (Mage=12.75; SD=.71; 51% female). Data from the current study were drawn from the spring 2019 (T1) and fall 2020 (T2) waves, when participants were in middle adolescence. Participants reported whether they had ever “smoked electronic vaporizers or e-cigarettes,” to indicate lifetime use (0=no, 1=yes). The Revised Peer Experiences Questionnaire (Queirós & Vagos, 2016) was used to assess overt (α=.86) and relational(α=.90) peer aggression. The Multidimensional Scale of Perceived Social Support (Zimet et al., 1990) scale was used to assess peer support (α=.93).

Results: Separate logistic regression analyses were used to examine longitudinal associations between each peer experience indictor (T1) and later e-cigarette use (T2), controlling for previous wave e-cigarette use, age, and gender(T1). Results indicated that, above and beyond past e-cigarette use, overt (OR=1.50, $p<.05$) but not relational ($p=.28$) peer aggression was associated with a greater likelihood of e-cigarette use six months later. Conversely, support from peers was associated with a lower likelihood of e-cigarette use six months later (OR=.78, $p<.05$). Discussion: Findings indicated that greater support from peers is associated with a lower likelihood of e-cigarette use, whereas overt peer aggression is associated with a higher likelihood of e-cigarette use, six months later. Peer relations are central social forces in adolescents’ lives and have been associated with a range of developmental and adjustment outcomes. Results from this study may be particularly impactful for informing programming designed to foster positive peer connections among adolescents to reduce health risk behaviors among young people.

ANXIETY DISORDERS IN ADOLESCENTS

Presenter: Yang, Wan Ju
Graduate, Psychology

Mentor: Prof. Caitlin Mercier

Authorship: Wan Ju Yang

Adolescents face risks for physical and mental challenges attributable to dramatic physical and psychological changes as well as the development of social relationships. Anxiety disorders are one of the most common mental illnesses in the world, and their age of onset is mostly during adolescence. Through an integrative review, I contribute to the understanding of anxiety disorders by physical, mental, and social risk factors as well as multicultural factors faced by adolescents that could have a distinct impact on them. I offer insights into challenges for research, clinical interventions, and care practice that address anxiety disorder for adolescents. To that end, I propose recommendations for clinicians, researchers, and educators to better work with adolescents with the knowledge of the unique challenges that they face.

EFFECTS OF DELAY ON FALSE MEMORIES FOR SEMANTIC AND PHONOLOGICAL LISTS

Presenter: Yuksel, Ece
Graduate, Psychology

Mentor: Prof. Dawn McBride

Short-term and long-term memory show different patterns of results based on varying aspects of stimuli. This study analyzes the change in false alarm patterns for phonologically-related lists and semantically-related lists in short-term memory and long-term memory found in past work in the lab. In past studies, lists words related by phonological aspects has produced more false memories than lists related by semantic (meaning) aspects when tested after a very short delay (less than 1 second); yet the reverse is found for longer delays between study and test (about 15-20 minutes). Thus, the research question in this study is when this major difference starts to happen and the two list types show similar levels of false alarms between short- and long-term memory. To answer this question, we are using a modified Deese-Roediger-McDermott (DRM) procedure (Roediger & McDermott, 1995) to test the memory of participants for multiple study-test delays (750 ms, 30 ms, 90 s, 3 min). Comparing the patterns of false alarms across delay times will give us some support for where the major change between these two memories occurs. Our hypothesis is that we expect to see a change in false alarm patterns starting at about 90 seconds with a full reversal of the pattern at 3 minutes. This result will support previous suggestions that long-term memory plays a significant role in retrieval after this time delay

COLLEGE STUDENT DRINKING: THE ROLE OF AFFECT AND PLANS

Group Leader: Yum, Seungok
Graduate, Psychology

Group Member: Michelle Duong, Graduate, Psychology

Mentor: Prof. Laura Finan

Authorship: Laura Finan, Seungok Yum, Michelle Duong

Risky alcohol use among US college students is a known public health problem (SAMSHA, 2020). Motivational models suggest emotions play an important role in why individuals use alcohol (Cooper et al., 1995; Cox & Klinger, 1988). Although some research suggests negative moods are related to more drinking and drinking-to-cope among college students (O'Hara et al., 2013), a recent meta-analysis found that people are more likely to drink heavily on days they were high in positive mood (Dora et al., 2022). Furthermore, college students in positive moods were less likely to drink without a plan (Fairlie et al., 2019), and planned drinking has been shown to be driven by diverse contextual characteristics (Stevens et al., 2022). Although extant studies suggest affect and drinking plans can play a role college students' alcohol use, less is known how these two factors work together to influence this health risk behavior. Therefore, we investigated interactive effects of diverse affective states and drinking plans on college students' alcohol use at the daily level.

A daily diary survey was used to collect 945 assessments from undergraduate students (N=113; Mage=20.16; SD=1.38; 79% female; 79% White) from a large Midwestern university. After a baseline survey, students completed daily surveys for 10 days between 6:00-11:59pm. Each day participants reported on their affect, substance use behaviors, and substance use plans. The 10-item short-form of the Positive and Negative Affect Schedule (Mackinnon et al., 1999) was used to assess affect. Participants reported the quantity and frequency of alcohol they drank the night before and how much they planned to drink that night. Analyses controlled for age and gender.

Findings from multilevel logistic regression models indicated planning to use alcohol was associated greater likelihood of actual alcohol use on a given day (OR=14.12, p<.000). Students were more likely to plan to use alcohol and were actually more likely to use on days when they were more excited (OR=1.31, p<.001; OR=1.24, p<.05) and enthusiastic (OR=1.28, p<.001; OR=1.20, p<.05), and less likely to plan to and actually use on days when more distressed (OR=.79, p<.01; OR=.81, p<.05). Notably, on days when students planned to use alcohol and were feeling more excited, they were more likely to use alcohol (OR=1.64, p<.01). Results from this study may be used to inform prevention efforts aimed at reducing the burden of disease stemming from college alcohol use by addressing the unique and additive roles of cognitive and emotional factors.

SOCIAL WORK

CHS PEER SUPPORT GROUP EVALUATION

Presenter: Bosley, Brittany
Graduate, Social Work

Mentor: Prof. Christopher Gjesfeld

Authorship: Brittany Bosley, Christopher Gjesfeld

The McLean County Center for Human Services (CHS) runs a Recovery program for individuals who have severe and persistent mental health disorders. The program offers peer support groups to give these individuals the opportunity for prosocial interaction and to build social or coping skills. Studies have found that more than half of people with severe mental illness are lonely. Loneliness can impair the ability to make and keep friends, participate in social activities, and create barriers with the communities (Perese & Wolf, 2005). The COVID-19 pandemic left many people feeling alone and socially isolated. Due to the pandemic, CHS had to move group meetings to Zoom and was not open for "drop-in" visits. Following the availability of vaccines in 2021, CHS has reopened for drop-in visits and in-person group sessions, however the staff has noticed participation in group sessions and “drop-in” visits remains lower than in pre-pandemic times.

We designed the current project to be an evaluative survey provided to clients of the CHS currently in the recovery program. Our primary goal was to find what these clients perceive as barriers to attending in the peer support groups offered by the CHS. Our survey also asked clients to describe the benefits of these groups and the ones they enjoyed most. At the end of the survey, the participants were given the opportunity to speak their minds about what improvements to the peer support groups they would like to see.

Results will be forthcoming in March 2023. The results of this project will be used to consider changes in the way services CHS implements and runs their peer support groups. Our goal is to provide these clients with more positive social opportunities by adapting existing groups or creating new ones that meet their specific needs.

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MODERATING AFFECT OF RELATIONSHIPS ON BURNOUT AMONG MENTAL HEALTH PROFESSIONALS

Presenter: Brower, Sara
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Sara Bower, Christopher Gjesfjeld

Burnout rates among mental health providers in recent years have been notably high indicating a concerning trend in the field. For the purpose of this work, burnout is best defined by the World Health Organization (2019) as a syndrome that results from excessive and chronic workplace stress that has not been managed successfully. There are a number of factors that have been found to contribute to burnout among clinicians some of which are workload, relationships with leadership and co-workers, and personal factors such as empathy. Research regarding possible interventions has been undertaken, however many of these interventions have been ineffective. Interventions at the organization level tend to be less effective than those targeted at the personal level, often because burnout has already occurred by the time organizational interventions are implemented. However, there is some evidence that interventions aimed at social cohesion within the workplace can reduce burnout because it helps to foster relationships between individuals thus ameliorating some work stress that leads to burnout (Eliacin et al., 2018). My hypothesis is that positive office culture and social relationships within the organization are associated with less burnout. This leads to the research question, do social supports and office culture impact the rate of burnout in mental health professionals?

A quantitative study will be undertaken that includes both a modified version of the MOS- social support survey (Sherbourne & Stewart, 1991) and a modified version of Maslach's burnout inventory (Maslach et al., 2016). Demographic information regarding age, gender, ethnicity, and years practicing will be collected. Survey data will be coded and analyzed using the Chi-square test. Data from Maslach's burnout inventory (Maslach et al., 2016) will be analyzed using measures of central tendency.

Data forthcoming in March 2023.

Implications: The results of this research may indicate a relationship between social cohesion in the workplace and rates of burnout thus leading to more targeted interventions.

BIBLIOTHERAPY AND DECISION-MAKING SKILLS

Presenter: Burnett, Sophie
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Sophie Burnett, Christopher Gjesfjeld

Interpersonal conflict is unavoidable and is a major aspect of elementary school students' interactions. The school environment is important to child development and socialization which form the foundation of their peer relationship experiences. (Elledge et al., 2016). Students are involved in issues that could be solved easily using bibliotherapy to improve decision-making techniques to limit conflict. Bibliotherapy is used by reading or telling stories that can teach valuable lessons. Reading stories in the classroom environment can build a strong foundation of social-emotional learning that will positively influence a child's behavior. Bibliotherapy can be used to target social skills, feeling identification, self-confidence, family related issues, bullying, and so on. The aim of this research is to discover if bibliotherapy, with a focus on decision making, can improve students decision-making skills. Ninja Life Hacks is a children's book series that was developed to teach these valuable life skills. These stories will be implemented to see the effectiveness of bibliotherapy on decision-making skills.

Participants in this study include 46 third graders and 55 second graders (101 total) who attend Washington Elementary School in Bloomington, Illinois. Participants include 49 females and 52 males between the ages of 7 and 9. The research that will be conducted is a social work Tier 1 intervention. Additional materials include the Ninja Life Hacks book bundle as well as worksheets and activities that have been created to go along with the lessons. Another material needed will be the pretest and posttest that will be completed before and after the implementation of the intervention. The research design of this study is experimental and uses a quantitative method. It aims to analyze the impact of a decision-making curriculum implemented in the classroom environment. The independent variable is the Ninja Life Hacks decision-making bundle while the dependent variable is decision-making skills.

As of now, only the pre-test has been administered. The post-test results will be completed and analyzed towards the end of February. The pre-tests have been scored and scores were better than an anticipated. A potential implication would be that there was little to no growth on the scores from the pre and posttests.

THE EFFECTIVENESS OF SECOND STEP DIGITAL ELEMENTARY PROGRAM AT JEFFERSON ELEMENTARY SCHOOL (#709)

Presenter: Bush, Morgan
Graduate, Social Work

Mentor: Prof. Kate Sheridan

This study explored the effectiveness of a Tier 1 social-emotional digital intervention called Second Step. Lessons were implemented in grade levels K-6 at Jefferson Elementary School in Morton School District (#709). All teachers of Jefferson Elementary were invited to complete electronic surveys regarding their opinion of the effectiveness of the Second Step lessons they administer. Students' social-emotional wellness was monitored using school-wide implemented surveys in areas of total behavior, academic, social, and emotional. This data will help determine if other elementary schools within the Morton School District utilize Second Step as a Tier 1 intervention next school year.

PROFESSIONAL DEVELOPMENT STAFF NEEDS

Presenter: Daniels, Kierra
Graduate, Social Work

Mentor: Prof. Kate Sheridan

This study explored professional development staff needs at Morton school district 709. This study included 70 special education staff and teachers. Participants were invited to complete an electronic survey by the Student Support Services director from district 709. Findings will inform decisions that will help plan professional development events and training for the upcoming 2023 school year.

TEACHERS ARE LEAVING PUBLIC EDUCATION AT ALARMING RATES

Presenter: Freeman, Rebecca
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Rebecca Freeman, Christopher Gjesfjeld

Teachers are leaving the public school system at alarming rates. The United States Bureau of Labor Statistics (2022) reported approximately 10 million current public-school educators. This is a downward trend from 2020 when there were about 10.6 million public-school educators. Teachers are reporting incredibly high levels of stress and are opting to leave the profession. The studies show there are three main reasons teachers are burning out: 1- Behaviors of children, 2- Limited social emotional competence (of the teachers) and 3- concerns about their own mental health. Teacher stress has potentially devastating consequences for the field of public-school education in the United States. Students are negatively impacted when teachers are experiencing such elevated rates of stress. The first step to stopping the high turnover rates is to understand what are the main stressors teachers are facing and what support they need?

This research project will be a qualitative design with public elementary school teachers as participants. I will use the Measures of Stressors and Supports for Teachers created by Dr. Sandilos and Dr. DiPerna with demographic questions to better understand what teachers need. The MOST survey is an assessment tool that looks at ten different areas that can have influence on a teacher. The ten areas are: parents, colleagues, school leadership, belonging, classroom students, students with disabilities, time pressure, professional development, safety and emotional state. I hope to use the information I gather to better support teachers in order for them to be more equipped to support the students in their classrooms.

Data collection is ongoing; as of February 15, 2023, there have been 18 responses to the survey. Reference:

U.S. Bureau of Labor Statistics. (2022). Job opening and Labor turnover survey. U.S. Bureau of Labor Statistics. Retrieved October 20, 2022, from https://www.bls.gov/jlt/

A PILOT TEST OF A SURVEY INSTRUMENT TO MEASURE SOCIAL PROMOTION GRADING PRACTICES IN CENTRAL ILLINOIS HIGH SCHOOLS

Presenter: Gary, Zari
Graduate, Social Work

Mentor: Prof. Kate Sheridan

This study is a pilot test of a survey instrument to explore and describe grading practices utilized by high school teachers in Central Illinois which are based on social promotion. Social promotion grading practices refers to assigning passing grades to students with the intent of keeping them with their age-appropriate school cohort, rather than being based on academic competence. The survey instrument is being field-tested to provide feedback on survey items including recommendations of additional questions or revisions to proposed survey items. The design is participatory research in order to gain the benefit of experience and insight from parents with high school aged children.

DIVERSITY AND INCLUSION HIRING PRACTICES RURAL SCHOOL DISTRICTS

Presenter: Gill, Helena
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Helena Gill, Christopher Gjesfjeld

Diversity and inclusion have been a push subject in recent years. Corporations, businesses, and schools are interested in expanding their company by hiring individuals with various backgrounds. These efforts are essential; nevertheless, the bases behind hiring diverse candidates are also important. However, how companies implement this training has been mentioned less. The issue arises from the safety of the individual employees seeking to be employed. Creating opportunities for diversity and inclusion in the work environment is needed. Our research is essential because a homogenous population can promote "groupthink," impairing problem-solving. Also, hiring discrimination becomes intergenerational when it is unaddressed. This research looks to gain knowledge on diversity and inclusion hiring practices from employees hired in rural schools.

To obtain information to determine if the hiring process in rural communities is diverse and inclusive, I will create a survey to gather this information. The survey consists of sixteen items in an open-ended format. The survey will be anonymous to protect the staff's identity. However, they will be asked about demographics such as age, gender, race, and the highest level of education. I will conduct a convenience sample by emailing a link to the survey to all staff in the district and neighboring districts. The collected data will be coded and transformed into qualitative data. Data will represent the viewpoint(s) of staff employed regarding their districts' diversity and inclusion hiring practices.

At this point, my results are not in yet. However, results will be used to further knowledge of diversity and inclusion in rural communities. Districts can use the research information to implement or revise their diversity and inclusion hiring practices.

INEQUALITIES IN CARE AMONG U.S. VETERANS

Presenter: Henslick, James
Graduate, Social Work

Mentor: Prof. Kate Sheridan

This study explores potential inequalities in care among disabled U.S. veterans.

RISK OF SECONDARY TRAUMA IN PEER ENGAGEMENT SPECIALIST

Presenter: Hines, Shannon
Graduate, Social Work

Mentor: Prof. Kate Sheridan

The purpose of this study is to explore the potential risk of secondary trauma for peer engagement specialist who work in a mobile crisis team. A secondary trauma survey was distributed to all central Illinois engagement specialist who work in a mobile crisis team under the Unity Point/Carle umbrella. The findings will be used to enhance training.

A STUDY ON FOSTER PARENT'S KNOWLEDGE OF TRAUMA-INFORMED CARE

Presenter: Hudomiet, Emily
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Emily Hudomiet, Christopher Gjesfjeld

Many children in the foster care system have experienced multiple traumas in their life, furthermore, the research concludes that these trauma symptoms negatively affect the foster youth and their foster parents. Considering the importance of trauma, it is essential to ensure that foster parents are knowledgeable about trauma and the impact trauma may have on their behavior. Based on my research of current literature, there is a gap in knowledge regarding foster parents and their knowledge as well as their experiences with these foster youth. Before we know the content and methods for providing information regarding trauma, we must fill certain gaps in this area by understanding the specific knowledge of foster parents. My qualitative study attempts to fill the research gap regarding what foster parents know regarding trauma within the foster youth population. Some of the questions we asked the foster parents included: A) How many children have you fostered who did not complete their permanency plan while in your home? B) Was there a reason the placement was unsuccessful? C)Were you given background information on any of your foster children regarding possible behavior/emotional problems? If not, would it have been helpful if you had? D) Were you aware that your foster child may have experienced trauma? With this research, we hope to fill the current knowledge gap within the foster care system to provide foster children with the best trauma-informed care possible.

HEARTLAND COMMUNITY COLLEGE COUNSELING SERVICES

Presenter: Hulett, Joshua
Graduate, Social Work

Mentor: Prof. Kate Sheridan

The goal of this study was to evaluate the knowledge Heartland Community College students had of the student counseling program. A written survey was provided to students in the psychology program at Heartland Community College to determine their knowledge of the program. Findings will be used to determine how to improve outreach and education of the counseling program to Heartland students.

SECONDARY TRAUMATIC STRESS AND THE RELATIONSHIP TO BURNOUT IN CHESTNUT STAFF

Presenter: LaRocco, Abigail
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Abigail LaRocco, Christopher Gjesfjeld

Over the last 20 years, there has been concern about the relationship between helping professionals who treat traumatized clients, their potential of developing PTSD-like symptoms, and developing feelings of burnout. The effects of treating traumatized patients can be defined as Secondary Traumatic Stress or STS. Secondary traumatic stress is the emotional duress one experiences after listening to an individual's experience firsthand. Symptoms of STS can include intrusive thoughts, depression, job avoidance, and a lack of motivation. Burnout is when one loses interest or grows tired from the stress of overworking. Although STS and Burnout can negatively impact work experience or performance, understanding triggers may be beneficial to finding potential relief outlets. We attempt to measure STS in a sample of individuals who regularly work with individuals experiencing high levels of trauma. We hypothesize that STS correlates with burnout, depression, and a desire to leave.

We conducted a mixed-method survey of about 20 Chestnut Staff who are in some way exposed to client interaction (e.g., LCPC, LCSW, MSW, or mental health staff). We collected between January 2023 and March 2023 and used items from the Secondary Traumatic Stress Scale and the Burnout Assessment Tool. We specifically took the portions of the two scales focusing on avoidance, exhaustion, and cognitive impairment symptoms. A self-disclosure form will be delivered before any other survey question. Following the disclosure, a survey will be distributed to Chestnut Staff and incorporate a Likert scale and short answer questions regarding secondary stress and burnout. Data will be forthcoming in March 2023. Our results are significant because we hypothesize that there is a direct correlation between Secondary Traumatic Stress and Burnout, causing less motivation or a desire to leave among Chestnut Health systems Staff. If our hypothesis proves correct, we may find solutions to help with symptoms of burnout and secondary stress.

MEETING SPACES FOR TRAUMA-RELATED COUNSELING AND ADVOCACY

Presenter: Markley, Charlotte
Graduate, Social Work

Mentor: Prof. Kate Sheridan

Limited research exists on the impact of the physical space on mental health treatment. This study explored the impact of the available meeting spaces on clients at a sexual assault crisis center. Staff and clients at the YWCA Stepping Stones program in McLean County were invited to complete surveys on their perceptions and experiences in the available private meeting spaces used for client-staff interactions.

EXPLORING A NARCAN AND FENTANYL TEST STRIP DISTRIBUTION PROGRAM AT A MEDICATION ASSISTED RECOVERY CLINIC

Presenter: McAuley, Melissa
Graduate, Social Work

Mentor: Prof. Kate Sheridan

The purpose of this proposed study is to explore client use of Narcan and Fentanyl Test Strips, client perceptions about Narcan and Fentanyl Test Strips, client behavioral changes associated with Narcan and Fentanyl Test Strips, and the efficacy of the Narcan and Fentanyl Test Strips distribution efforts at medication assisted recovery clinics in Illinois.

THE IMPACT OF SOCIAL MEDIA AND MIDDLE SCHOOLERS MENTAL HEALTH

Presenter: Nottke, Nicole
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Nicole Nottke, Christopher Gjesfjeld

Adolescents are spending more time on their phones. Social media such as YouTube, Instagram, Snapchat, and TikTok have become some of the most popular platforms for adolescents, with TikTok and YouTube being the most popular social media platforms. Although social media can a convenient tool for youth to learn skills and make social connections, social media can cause middle schoolers to feel upset, and experience bullying, which could potentially lead to psychological concerns like depression and social isolation.

Given the lack of research on how social media affects adolescents' social-emotional well-being within schools, we are testing to see how social media affects middle school students and if it is essential for educators and professionals who work in middle schools to learn and understand how social media can impact a student's psychological and social-emotional well-being. We conducted a survey sent to 8th-grade students at Parkside Jr. High School. Parental passive

consent was provided for all 8th-grade students to complete this survey. The survey was sent out via email on January 30, 2023, to all 8th-grade students to complete during their advisory class period. 58 students anonymously completed the survey. The survey concluded with 35 questions: basic demographics, social media survey, and the UCLA (University of California, Los Angeles) loneliness scale. The UCLA loneliness scale ranges from a low degree of loneliness to a high degree of loneliness. Results from the survey concluded that 29 participants spend more than 3 hours a day on social media. Of those 29 participants, 12 scored a low degree of loneliness scores, 12 participants scored in a moderate degree of loneliness scores, 4 participants scored a moderately high degree of loneliness, and 1 scored a high degree of loneliness.

Implications include limited research and data on how social media affects middle schoolers' psychological and social-emotional well-being and school curriculum. Schools focus on academic and health courses but have limited technology courses that teach students proper social media safety and awareness of social media. With technology increasing within schools, and social media usage increasing among youth, we believe that social media awareness should be implemented within schools.

SECONDARY TRAUMATIC STRESS AMONG HELPING PROFESSIONALS AT THE CENTER FOR YOUTH AND FAMILY SOLUTIONS

Presenter: Ramirez, Veronica
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Veronica Ramirez, Christopher Gjesfjeld

Secondary traumatic stress (STS) refers to the emotional and psychological impact of empathetically listening to clients' experiences of trauma. People who are in the helping profession are more likely to find themselves at risk for experiencing STS than other professionals might be due to the nature of their work. Research has found that the experience of STS is similar to that of posttraumatic stress disorder. It has also been found that STS is positively correlated with a decline in job performance and job retention among the helping profession. Our research recruited staff from The Center for Youth and Family Solutions (CYFS) to inquire about their personal experiences with STS. This also included their thoughts on how the agency might be able to provide more support for their employees regarding STS.

We conducted both a qualitative survey and virtual interviews that consisted of 6 open-ended questions that were administered to participants. This survey and virtual interviews were administered in February 2023. All participants were identified as CYFS staff from all of its 11 locations across the state of Illinois and from its 7 departments/programs. All participants identified themselves as being 18 years or older.

Data will be forthcoming in April 2023. With these results, we see potential in bringing awareness to the experiences of STS among CYFS staff and inform initiatives towards continuing the agency's efforts to better support its staff in the future.

THE EFFECTIVENESS OF MTSS TIER 1 SEL IMPLEMENTATION AT WOODROW WILSON SCHOOL (K-2)

Presenter: Reents, Justine
Graduate, Social Work

Mentor: Prof. Kate Sheridan

The aim of this study was to examine the effectiveness of the implementation/curriculum of SEL Tier 1 instruction, and the impact it has on students at Woodrow Wilson Elementary in East Peoria, IL. All staff members (administrators, teachers, and teacher's aides) were invited to complete an anonymous-online survey to give their input and opinions on the social-emotional learning occurring in their school. The findings from this study will show if the implementation of social-emotional learning is occurring regularly, as well as if the SEL curriculum is having a positive impact in students social-emotional behaviors from the Winter to Spring benchmarking periods.

A COLLABORATIVE EXPLORATION OF THE RELATIONSHIP BETWEEN HOME VISITING PROGRAMS, HOME VISITORS & CHILD WELFARE CASEWORKERS

Presenter: Reeves, Iyasha
Graduate, Social Work

Mentor: Prof. Kate Sheridan

This study explores the perception of home visitors and child welfare collaborative efforts through working relationships with mutual clients/families. This study included results from 20 individual participating home visitors from 1 distinct agency within 3 central region sites in Illinois. Of these sites, 3 programs use Healthy Families (HFI) model while 1 uses the Parents as Teachers (PAT) model. All participants were emailed a survey and consent to participate in this study. Findings from this study will be used to see how to best cultivate support and continue to grow the relationships of support for families served by both professionals.

IMPACT OF SOCIAL WORKER RIDE-ALONGS ON POLICE OFFICER PERCEIVED STRESS AND MENTAL HEALTH STIGMA IN MOLINE, IL

Presenter: Steele, Cassandra
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Cassandra Steele, Christopher Gjesfjeld

The future of policing in the United States is an emotionally charged topic with high stakes outcomes. The role of social workers working with police is one of the most frequently discussed avenues to improve police and community relations, with just as emotionally charged and diverse opinions. It is worth knowing that partnerships between police and social workers are not new. In 1919, August Vollmer, largely considered the “father of American policing,” considered poverty, unemployment, inadequate housing, poor peer relationships, and others as factors of crime. He urged police to collaborate with social service agencies and community organizations in the creation of schools, clinics and hospitals, recreation, and community centers, among others as a way to proactively alleviate the causes of crime (Patterns & Swan, 2019). The exact implementation of social work with policing is in its infancy and current pilot programs will directly impact how policing will change nationwide.

This project takes a quantitative approach to analyze the impact of social workers on the officer’s perceptions of mental health and perceived stress in the Moline, IL Police Department through an existing partnership with the Center for Youth and Family Solutions (CYFS) that includes social-worker ride alongs. The study is cross-sectional and quasi-experimental with a comparison group. I administered a voluntary survey available to all officers of the department that included the Perceived Stress Scale (Cohen, 1994) and the Police Officer Stigma Scale (Stuart, 2017), as well as survey questions specific to the police and social worker partnership.

Preliminary data shows that officers in Moline Police Department look favorably on the partnership with social workers. Data illustrating how the partnership influences perceived stress and mental health stigma is still being submitted. Analysis will be prepared in March.

Implications for findings include possible expansion of the partnership within the Moline PD. Should the study show that social workers have an impact on officer’s stigma about mental health and perceived stress, the study could be repeated following the federal research guidelines and be published as a model for other departments.

FATHER'S PERSPECTIVE OF SPECIAL EDUCATION

Presenter: Strong, Morgan
Graduate, Social Work

Mentor: Prof. Christopher Gjesfjeld

Authorship: Morgan Strong, Christopher Gjesfjeld

Special education in public schools supports children who have disabilities learn in a least restrictive environment. As special education continues to adapt and improve over the years, researchers look to families to help improve the services children receive. In previous research, the mother of families is often highlighted in research as the most involved parent in special education services and support for their children. The view that mothers are the more active parent, stems from other myths which have negatively impacted how fathers are view and unfortunately impacts how fathers even view themselves. Because of the myths that surround fathers in families and their role, it has led to a decrease in understanding of father's perspectives and their experiences supporting their child in special education. The goal of the current research will seek to better understand the active father and their direct experiences supporting their children in special education. Father involvement is defined as the social and functional involvement in their child's life.

The current study will involve fathers of children ages 3-11 in a rural setting through non-probability convenience sampling. The researcher is relying on available fathers in the rural school district. The data will be collected via an online survey created by the researcher including qualitative and quantitative data, a mixed-methods design. The qualitative section of the current research study focuses on using the phenomenology research design. The current study will seek to understand lived experiences (thoughts, perceptions, and ideas) of father participants who have children in special education. Descriptive data will also be collected.

The open-ended and short response questions in the survey will be analyzed by a speculative inquiry process done by the researcher to collect information on common themes among responses.

The results of this survey will contribute to current research on portraying a more accurate picture of father involvement and perspectives on their child's special education services. In addition to provide thoughtful responses in how special education teams can better support an entire family unit. Implications of the current research will provide a better understanding of father's perspective of special education and supporting their child(ren). By better understanding an entire family unit, educators and service professionals can better support families and children receiving special education services.

Keywords: special education, father's perspective, involvement, rural, survey

SELF MANAGEMENT AND SELF EFFICACY SKILLS IN ELEMENTARY SCHOOL STUDENTS

Presenter: Thompson, Erin
Graduate, Social Work

Mentor: Prof. Kate Sheridan

This study explored self-efficacy skills and self-management skills of elementary students. This study included data from elementary students and elementary teachers at a local school. Participants were invited to complete an electronic survey about changes in self-efficacy and self-management in students. Findings will inform administration to develop supports to increase self-efficacy and self-management strategies.

MEASURING THE QUALITY OF MENTAL HEALTH SERVICES FOR THE UNINSURED AND UNDERINSURED

Presenter: Tomczewski, Kathleen
Graduate, Social Work

Mentor: Prof. Kate Sheridan

This study explored client satisfaction in regards to receiving mental health services for the uninsured and underinsured within the community of Bloomington-Normal. The purpose of the study examines whether services provided by Integrity counseling are beneficial to the community and whether clients are satisfied with the services provided. Clients who have had at minimum four or more counseling sessions were invited to complete a survey assessing client satisfaction and perceived progress towards counseling goals. Findings will be used to help Integrity Counseling understand how to better provide services to future clients.

SOCIOLOGY/ANTHROPOLOGY

IS THE TEMPORAL STYLOID PROCESS A UNIQUE SPEECH STRUCTURE IN HUMANS?

Presenter: Martin, Sommer
Graduate, Sociology/Anthropology

Mentor: Prof. Shelby Putt

Authorship: Sommer Martin, Shelby Putt

The elongated temporal styloid process in humans serves as an attachment point for the styloglossus, stylohyoid, and stylopharyngeus, which are involved in tongue movement and deglutition. We hypothesized that an elongated styloid process in humans is the result of selection for increased musculature that would support tongue movements that are involved in speech and aid in the movement of the oropharynx and laryngopharynx during deglutition. This hypothesis assumes that an elongated styloid process is unique to humans. To test this hypothesis, we conducted a comparative analysis of the presence or absence of the temporal styloid process on ten species of Old World primates. We found that this structure is not unique to humans but also exists in baboons. In Papio, the styloid ligament, styloglossus, stylohyoid, and stylopharyngeus attach to the styloid process in a similar manner to the human soft tissue articulations. This indicates that the temporal styloid process that is present in humans and baboons is a convergent evolutionary structure and therefore not specially adapted for speech.

THE GET ACQUAINTED PROCESS: THE EFFECTS OF ATTACHMENT STYLES ON SELF-DISCLOURE

Group Leader: Munoz, Mariana
Undergraduate, Sociology/Anthropology

Group Members: Samantha Tate, Undergraduate, Psychology; Sarah Jacobsen, Undergraduate, Psychology; Carlos Morn-Toro, Undergraduate, Politics and Government; Taylor Starr, Undergraduate, Sociology/Anthropology; Sophia Larson, Undergraduate, Sociology/Anthropology; Erin Hennessy, Undergraduate, Sociology/Anthropology

Mentor: Prof. Susan Sprecher

Attachment orientation is a frequently examined individual difference variable in relationship science. Adult attachment orientation refers to people's tendency to feel comfortable forming relationships (a secure style) or to be anxious or avoidant about relationships (insecure styles). Attachment orientation – which develops during childhood based on family experiences and can change with new experiences – can have important influences on adults' relationships (Milkulincer et. al., 1991). A few prior studies consider how patterns of self-disclosure may differ as a function of attachment orientation in different types of relationships. For example, Shechtman and Rybko

(2004) found that in group counseling sessions, participants with a secure attachment style self-disclosed more than the other participants with insecure attachment styles. In this study, we examine how young adults' attachment orientation is related to the degree to which they self-disclose, specifically, in getting-acquainted interactions. We expect to find that those individuals with secure attachment styles will self-disclose more than those with insecure attachment styles. We also look at gender differences in the degree of self-disclosure in first interactions and expect to find women will self-disclose more than men.

We (a research lab group working under Dr. Susan Sprecher) analyzed data that were compiled from several prior social interaction studies conducted over many years in her lab at ISU. In each study, pairs of previously unacquainted students engaged in a getting-acquainted exercise in a lab setting. In a pre-interaction survey, the participants were given Bartholomew and Horowitz's (1991) four-category attachment model which described the types of attachment styles we plan to measure. The participants were then asked to indicate how well each attachment style described them. In a post-interaction survey, the participants describe how much they had self-disclosed and how much their partner had self-disclosed. More specifically, participants answered questions on a 7-point scale rating the interaction they had with the other partner. We will first present descriptive informations (e.g., how much they disclosed overall), followed by results examining whether people who have different attachment styles vary in their self-disclosure levels in a first interaction, both as reported by themselves and as indicated by their conversation partner. One preliminary finding is that individuals who described themselves with a secure attachment style reported that they shared more intimate details with their partner than those who described themselves with an insecure attachment style. Our secondary focus on gender differences in self-disclosure levels suggested that females reported self-disclosing more to their interaction partner than males did.

AN EXAMINATION OF INDIVIDUAL FACTORS ASSOCIATED WITH THE EXPERIENCE OF COMPASSIONATE LOVE FOR STRANGERS/HUMANKIND

Group Leader: Odeh, Yasmin
Graduate, Sociology/Anthropology

Group Members: Fiona Fleming, Graduate, Sociology/Anthropology; Mariana Munoz, Graduate, Sociology/Anthropology; Samantha Tate, Undergraduate, Psychology

Mentor: Prof. Susan Sprecher

Authorship: Fiona Fleming, Yasmin Odeh, Mariana Munoz, Samantha Tate

Compassionate love is one of the major types of love that humans can experience, although it has been overshadowed by the study of romantic love. Sprecher and Fehr (2005) described compassionate love as including "...feelings, cognitions, and behaviors that are focused on caring, concern, tenderness, and an orientation toward supporting, helping, and understanding the other(s)" (p. 630). They developed the Compassionate Love Scale (CLS) with the purpose of measuring an individual's predisposition to feel compassionate love for others. The scale was designed to be used, in different forms, to assess compassionate love for a variety of targets, ranging from romantic partners to strangers and humankind. Considerable evidence has been found for its reliability and validity, including in brief forms (Hwang et al., 2008; Sprecher & Fehr, 2021). Many research questions have been investigated using the CLS, including the examination of factors that promote or are associated with compassionate love. However, prior research has disproportionately investigated factors associated with compassionate love for close others; thus, more research is needed on experiences of compassionate love for non-close others. More specifically, we address the question of who is most likely to experience compassionate love for distant others, strangers, and/or humankind. Because compassionate love is associated with many positive actions, such as volunteering, providing social support, and engaging in helping behavior (Sprecher & Fehr, 2005), it is useful to identify who is most likely to experience it. As part of several laboratory studies, participants (N ~ 700) completed a survey that included a short form of the CLS with

strangers/humankind as a target (e.g., "I tend to feel compassion for people, even though I do not know them"). Several individual difference variables were also measured, including gender, race, and attachment styles. Preliminary results indicated that women had higher scores than men on the CLS ($t[696] = 4.65$, $p < .001$). No significant race differences were found ($F[2,666] = 1.07$, $p = .34$). Attachment security was positively associated ($r = .11$, $p = .03$) and dismissive avoidance was negatively associated ($r = -.11$, $p = .03$) with compassionate love. Other results will be presented. The study contributes to the understanding of factors and characteristics associated with the propensity to experience compassionate love for strangers/humankind.

PERSPECTIVES OF KENYAN WOMEN (ELGEYO-MARAKWET COUNTY) WHO UNDERWENT FEMALE GENITAL MUTILATION/CIRCUMCISION (FGM/C)

Presenter: Tanui, Melon
Graduate, Sociology/Anthropology

Mentor: Prof. Jason Whitesel

This qualitative case study focuses on women from Elgeyo-Marakwet county in Kenya, several of whom have undergone what has come to be referred to by the Western world a female genital "mutilation" (FGM). This procedure "involves the partial or total removal of the external female genitalia" or inflicting any other damaging injury on "the female genital organs for non-medical reasons" (WHO 2022: para. 1). The residents of this county are Kalenjin speakers of Keiyo and Marakwet sub-dialects. County residents refer to FGM as *Yatitaet,* which loosely translates to "circumcision." The process, which lasts from days to a month, is called *Tumdop Tibiik,* meaning the initiation of girls.

During initiation, cultural values, skills, attitudes, and behavior are passed down to young girls to prepare them for adulthood within the Keiyo/Marakwet community. No religion mandates female genital mutilation/circumcision/cutting (FGM/C); rather, patriarchal interpretations / lessons of religion create the cultural backdrop that allows this practice to persist (*Women's Health News 1998*). FGM/C "has no health benefits"; yet it has been difficult to eradicate, due to patriarchal cultural practices and religious beliefs among practicing communities.

The research method I will use is in-depth interviews with 8 to 10 adult women who have undergone female circumcision. The purpose of the interviews will be to learn the deeply rooted traditional belief in the "purity" of a woman who has been circumcised. My researcher's position is one of a Kenyan insider who has become a critical outsider through education, i.e., I hold the Western view of (FGM/C) as a human rights violation as condemned by the World Health Organization (WHO 2022), while at the same time I recognize the deeply rooted patriarchal belief behind the practice: to curtail or altogether prevent a woman's pleasure so that she remains a loyal wife and child-bearer.

Findings of my research will contribute to an understanding of a phenomenon—the practice of female circumcision—and earning me the researcher integrity to evaluate that phenomenon within its own context, by extensively quoting the women who have undergone circumcision. Implications of this research can be far-reaching by elevating the voices of the women themselves to be heard, those who have "bought into" the practice, those who oppose it, as well as those who are on the fence, given their respect for and understanding of their tradition.

ZOOM ZEN AND BUDDHIST MEDITATION IN DENVER

Presenter: Virklan, Noah
Undergraduate, Sociology/Anthropology

Mentor: Prof. Nobuko Adachi

For my senior thesis I will argue that American Zen meditation centers, following a trend of increased interest in mindfulness-based stress reduction among a greater virtual audience, transitioned to remote practices because of the quarantine isolation period. Previous scholars claim (Raifman J. et al. 2022) that the COVID-19 isolation period, coupled with loneliness, and economic precarity, greatly increased suicidal stressors for the general population. Many psychologists urged that mindfulness meditation, when combined with cognitive therapy, concluded with around 87% of suicidal patients (n=16) finding “interesting” or “helpful” coping skills for ideation intervention when compared to normal talk therapy (Chesin et al 2018, 454). I will show that many meditation forms brought to America are the result of Buddhist influence. For example, the inclusion of Buddhist loan words like Zen and Mantra into secular MBSR (Mindfulness-Base Stress Reduction) and Yoga practices, and that many yoga postures and breathing techniques are likewise imported from a long history with Sanskrit. I demonstrate this correlation with 6 months of field notes acquired from two Zen Buddhist temples and a Diamond Way Buddhist group. The reason for this larger interest in Zen Buddhist meditation, I believe, was because people were invited to create new spaces over the internet which were associated with Karna’s (2018) description of “psychophysical skills” (that is, the meditative praxes, rituals, and teachings of Zen communities are reflexive of a lineage’s skillful ways in adapting the teaching of meditation skills to their audience, thereby compelling many Zen groups to employ a seamless transition of temple practice for an audience at home). I Support this claim with ethnographic interviews of Zen members and ordained Zen teachers. As internet communities, and their resulting subcultures, migrate to synchronous interactions over virtual telecommunication, this paper offers a useful revision to Grieve’s (2010) understanding of our relation to the so-called cyberspace.

SPECIAL EDUCATION

IMPACT OF MODIFIED DIALOGIC READING PLUS ASSISTIVE TECHNOLOGY ON A YOUNG CHILD WITH DEVELOPMENTAL DELAY

Presenter: Hanson, Mary-Kate
Undergraduate, Special Education

Mentor: Prof. Jeongae Kang

Authorship: Mary-Kate Hanson, Jeongae Kang

Dialogic reading (DR) is a shared interactive reading practice that has been shown to develop oral language skills and comprehension of young children, including children who have specific language impairments. In particular, modified dialogic reading (MDR), a combination of DR, visuals, and systematic instruction is known as a promising intervention to help children with autism spectrum disorders (ASD) improve reading comprehension and engagement. However, its effects on children with developmental delay (DD) are not known. In addition, existing research mainly uses a hard copy of visuals. To fill the gap in research, we examined the effects of special education teachers using MDR with assistive technology (AT) on the reading comprehension and engagement of young children with disabilities during the extended school year (ESY).

Using a case-study design we observed one kindergarten student with developmental delay (DD). We paired DR with the AT platform Boom Cards. Boom Cards enables teachers to customize interactive visual materials to fit the individual needs of their students. Using Boom Cards, one special education teacher implemented MDR four times a week for five weeks during ESY. We observed special education teachers using Boom Cards during student reading activities and collected a teacher survey to determine social validity. Student outcomes were measured by the number of correct responses to reading comprehension questions, the duration of engagement time, and the number of words. The correct number of reading comprehension answers (triad, binary, direct model/incorrect) and the amount of time students spent talking about what they read while using Boom Cards (engagement) were visualized. We compared the changes of the level and trend between the baseline and intervention phases of each student.

Our findings indicate that while we observed the improvements in reading comprehension and engagement, the variability of the data, including the amount and quality of questions during baseline, made it difficult to determine the direct effects of the MDR plus AT package on the participating student. The data demonstrates that following the implementation of the intervention, there was an increase in both the duration of engagement and the quantity of words utilized. In this presentation, we will discuss considerations for the improvement of future research.

LANGUAGE & BEHAVIOR

Presenter: Redfern, Madie
Undergraduate, Special Education

Mentor: Prof. Stef Gardiner-Walsh

This presentation will summarize eleven academic papers on language deprivation in D/deaf children and its impact. Sensorineural hearing loss is the most common congenital disability in all parts of the world, where two out of every 1000 children have prelingual hearing loss. The primary takeaway of this presentation is that research indicates that early exposure to sign language is the best choice to reduce language deprivation for D/deaf children.

THE IMPORTANCE OF EFFECTIVE PARENT COMMUNICATION

Presenter: Tilford, Mary
Graduate, Special Education

Mentor: Prof. Jeongae Kang

Authorship: Katie Tilford, Jeongae Kang

Parent involvement and communication decrease as students reach the junior high and high school levels. Many factors can change parental involvement during this time (Bhargava & Witherspoon, 2015). This study was conducted at a local junior high in central Illinois. The purpose of this study was to investigate the communication experience of parents of students during the Individualized Education Plans (IEPs) process and factors that impact parent communication. We used a mixed-method design with parent surveys and interviews. Statistical and thematic analyses were used to determine common themes in parent communication and experiences. Our quantitative findings from the survey indicated parents of students with autism were more likely to want more frequent contact with their child's case manager than families of students with other disabilities. In addition, families of students in the sixth grade wanted to hear from their child's case manager more frequently than families of seventh or eighth grade students. Our qualitative findings from the interview indicated families would like to receive more positive notes about their children. In addition, data shows that parents' relationships with current case managers was affected by the relationship with the past case managers. The overall findings of this study will guide professional development regarding parent communication and allow for reflection on adjustments that would enable parents to have a more positive experience.

THE PERCEPTIONS AND EFFECTS OF HIGH SCHOOL LIFE SKILLS PROGRAMS ON DISABLED STUDENTS

Presenter: Troxell, Zoë
Undergraduate, Special Education

Mentor: Prof. Melinda Snodgrass

Authorship: Zoë Troxell, Melinda Snodgrass

The purpose of this interview study is to understand how high school participants in special education life skills programs perceived those experiences and how the life skills program affected them. Life skills programs are typically designed to teach students with disabilities the skills they need for post-school employment, activities of daily living (e.g., hygiene, meal preparation), and self-determination and other social skills. We interviewed students who participated in a life skills program at and through their high school as part of their special education services. We asked participants about their experiences, their perceptions of the experiences, and how they perceive the program to have affected them. We describe our findings and discuss the ways in which life skills programming positively and negatively affects disabled students. We offer implications for educators to inform future educational decision making to maximize benefits to all students and minimize harm.

TEACHING AND LEARNING

TEACHERS IN THE EDUCATIONAL OVERSEAS: STRESS, BURNOUT, AND RESILIENCE DURING AND AFTER COVID-19

Presenter: Anggriawan, Robby
Graduate, Teaching and Learning

Mentor: Prof. Do-Yong Park

Authorship: Robby Anggriawan

As expected, teaching abroad is a life-changing experience for teachers (Cross and Dunn, 2016; Celik, 2017). Undoubtedly, it will be a new experience and an eye-opening moment for them, which can also shape their future lives. However, it can also be challenging for them as they are in a place where the culture differs from their home countries. It got even worse when the Covid-19 pandemic occurred and affected many aspects. In this study, eight teachers in overseas educational contexts have been awarded Fulbright scholarships and taught in their host countries (from the US to other countries and from other countries to the US). By using semi-constructed interviews, they have shared their bittersweet experiences, from adaptation to stress and burnout to resilience during and after COVID-19 or “the new normal.” However, this unique condition did not reduce the fundamental values of the exchange program itself, which is still noteworthy for deepening mutual understanding between their homes and host countries.

A CONCEPT MAP FOR A WHOLE-SCHOOL APPROACH TO MENTAL HEALTH: TRAUMA, AGENCY, AND THE CLIMATE-CRISIS INFORMING THREE PILLARS WITHIN THIS MODEL OF EDUCATION

Presenter: Lough, Derek
Graduate, Teaching and Learning

Mentor: Prof. Lara Handsfield

A post-COVID-19 world requires us to reevaluate how we frame mental health in education. Medical conditions associated with the numerous bodily and mental health issues that arose during a global pandemic are just now being investigated in earnest. Though our actions are grounded in hope, their impacts on our worldwide education system remain unknown. While we study the long-term effects, we must be accountable by adapting to those factors outside our ability to change and reinforce learning mechanisms within our students' control. These institutional changes may also serve our students, teachers, staff, and administration in primary, secondary, and schools of higher education as they encounter the impacts of climate change more often, both as geographically local incidents and psychological patterns of detriment or uncertainty. The concept map below will connect several theories in education and conceptual frameworks to show how three pillars of trauma-informed education, climate-ready actions, and supporting student agency will inform a whole-school approach that can be methodologically constructed to build a foundation for student mental health. While some of the literature points on the concept map will address well-known theories in education, most will have been peer-reviewed over the last five years.

TECHNOLOGY

USE OF WASTE GLASS AS AN ALKALINE ACTIVATOR AND FLY ASH AS PRECURSOR IN GEOPOLYMER CONCRETE

Group Leader: Kayani, Taimoor
Graduate, Technology

Group Member: Lucas Roslewski, Undergraduate, Geography, Geology, and the Environment

Mentor: Prof. Pranshoo Solanki

Co-Mentor: Prof. Guang Jin, Health Sciences

Authorship: Taimoor Kayani, Lucas Roslewski, Pranshoo Solanki, Guang Jin

In order to investigate the viability of employing waste glass as a potential alkaline activator in the synthesis of geopolymer concrete with fly as a precursor, an alkaline activator was created in this research by dissolving waste glass in a NaOH solution. There were three different sizes of glasses utilized. ICP-OES (inductively coupled plasma optical emission spectrometry) was used to determine the precise quantity of Na2O(Sodium Oxide) and SiO2(Silicon Dioxide) in the activator. 38 distinct Geopolymer Concrete combinations were created using three different types of glass and various concentrations of SiO2 and Na2O. Testing of specimens after 24 hours of heat curing (80 °C) and 24 hours of ambient curing at room temperature (23 °C) allowed researchers to determine the compressive strength of geopolymer concrete. It was discovered that the alumina and calcium content of the glass type affected the compressive strength of geopolymer concrete mixtures. Up to a particular content, beyond which a strength loss was seen, the compressive strength rose with Na2O Percentage. The peak strength of geopolymer mixtures containing both ACAS and DCF glass was reached at SiO2 of 3.0%. A significant factor in the activator's capacity to withstand compression was its modulus (SiO2/Na2O). The compressive strength decreased as a result of the greater liquid-to-solid ratio.

USING SMARTPHONE-BASED AUGMENTED REALITY FOR ASYNCHRONOUS LEARNING – A CASE STUDY

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Programming an industrial robot is one essential activity for manufacturing automation. The program can be done by either moving the robot arm manually with a teach pendant or designing the robot's tool path and tasks on a computer before sending the commands to the physical robot. The former approach might be straightforward but is slow and somewhat tedious due to the system's protective mechanism. Comparatively, the computer programming environment is broadly adopted by higher education. While capable of quickly verifying the program through low-risk simulation, it demands high-level cognitive activities from the users. Its steep learning curve could be overwhelming for novice learners, and the complexity of the software is unsuitable for asynchronous learning.

This presentation describes a new learning approach that could address this concern. A virtual robotic system can be presented in a smartphone-based augmented reality (AR) viewer to convey the learning objective and the intended outcome. Once the virtual system is anchored on a flat surface such as a tabletop or floor, the user can move around with their phone and zoom in/out to study the detail. A preliminary study determining the effectiveness of this approach will be presented. The following questions will be assessed with a small group of participants: (1) How can the AR models help students comprehend assignments and projects? (2) In what way can the AR viewer enable better project collaboration synchronously and asynchronously? This presentation will conclude with lessons learned and suggest best practices for designing learning activities with AR in mind.