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2021
Abstract Book

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What's really in the vial of curcumin?

Riley Allison

Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Valeria Stepanova***
Discipline: ***Organic Chemistry***

Presentation Type: ***Poster presentation***

Abstract:

Curcuminoids are commonly used as a treatment to prevent against Alzheimer's disease, cancer, and inflammation. There are three different types of curcuminoids in turmeric: curcumin, demethoxycurcumin, and bisdemethoxycurcumin. Curcumin is thought to be the most bioactive. Because of these three different types of curcuminoids, purification of curcumin extracted from natural sources can become really complicated. Purification of curcumin is frequently done using complicated and extensive techniques, such as column chromatography, factional crystallization, and extensive extractions. For this research, a simple purification method that consisted of extraction or crystallization using water and/or hexane was used to access its effectiveness towards purification of a commercial curcumin sample with listed 65% purity. Although the manufacturer lists curcumin or curcuminoid content at 65%, the remaining 35% are not addressed. Classification of chemical composition for the samples was analyzed using TLC, NMR, and the melting point. This data was used for determining the composition of the commercial curcumin sample and illustrating the efficiency of our straightforward purification method. The intellectual merit of our research is effective, environmentally friendly, and an expedient purification method to these biologically important compounds. The broader impact of our study can facilitate biological study with pure curcumin(oids) (>98%) at low cost without resorting to state-of-the-art purification techniques.

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Zitterbewegung electromagnetic proton model

Micah Atkins (Steven Verrall)
*indicates presenting at Seven Rivers

Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Steven Verrall***
Discipline: ***Physics***

Presentation Type: ***Oral presentation***

Abstract:

The proton's key physical attributes are spin, mass, charge, charge radius, and magnetic moment. Well established proton models consist of point charges, called quarks, rapidly moving in a confined manner. The confinement is thought to be due to massless gluons. Despite increasing sophistication aided by supercomputer simulations, such models have failed to explain all of a proton's spin and mass. Charge quantization remains a mystery. In addition, neither a free quark, nor a free gluon, has ever been detected. This project models a proton without using quarks or gluons. It is called the zitterbewegung electromagnetic (ZEM) proton model. The basis of the ZEM proton model is a self-circulating circularly polarized seed photon. A pair of such seed photons may briefly appear during proton-antiproton pair production. Mass is modeled as light-speed toroidal flow known as the zitterbewegung effect. Charge is modeled as the poloidal flow of the electromagnetic fields of the seed photon. This explains charge quantization. Two massless oppositely charged shells form a spindle torus structure well outside the circulating mass. Algebraic analysis is used to calculate the both the proton's charge radius and magnetic moment to within 0.15% of their latest CODATA values. The ZEM model is refined, using just one adjustable parameter, to calculate both the proton's charge radius and magnetic moment to 4 significant

digits. The refined ZEM model is used to explain recent experimental results involving high-speed collisions of atomic nuclei.

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Propranolol Reduces Probability of Sign-Tracking Behavior in Male Sprague-Dawley Rats

Kiya Azure

Institution: **Winona State University**

Faculty Mentor: ***Dr. John Holden***
Discipline: ***Psychology***

Presentation Type: ***Poster presentation***

Abstract:

Drug addicts who attempt rehabilitation are often confronted with triggers for drug-seeking behavior – classically conditioned stimuli that are associated with drug use. The overriding of volition seen in the relapsing drug addict has some commonalities with sign-tracking, the behavior of approach/interacting with a signal for an appetitive outcome. To the extent that stimulus triggered drug-seeking during rehabilitation and sign-tracking have features in common, it may be possible to reduce drug-seeking using measures and medications found to be useful in reducing sign-tracking. We tested a beta-blocker, propranolol, in the sign-tracking task, hypothesizing that it would reduce sign-tracking behavior. Male Sprague-Dawley rats were tested in this task under three conditions: low dose propranolol, high dose propranolol, and saline vehicle only. Propranolol significantly reduced the probability of sign-tracking in our study, suggesting it may be an effective rehabilitation agent.

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Effects of Prazosin on Sign-Tracking

Kiya Azure, *Amanda Barbaro (Megan Arth, John Holden)
*indicates presenting at Seven Rivers
Institution: **Winona State University**

Faculty Mentor: ***John Holden***
Discipline: ***Psychology***

Presentation Type: ***Poster presentation***

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Abstract:

Classical conditioning, such as displayed by Pavlov's dogs, happens to humans as well. In the case of drug addiction one may equate triggers with drug use. Somebody struggling with heroin addiction, for example, may engage in drug seeking behaviors when they see a syringe or pass the street they bought drugs at in the past. This behavior is similar to sign-tracking which involves approaching a cue for a appetitive stimulus. We are studying the effects of Prazosin on sign-tracking in male Sprague-Dawley rats because we are interested in the effects of an alpha blocker on behavior. We first acclimated them to a skinner box that would release a treat pellet and extend a lever at the same time. After 5 days of this we measured their level of interaction with the lever under control, low drug dose, and high drug dose conditions. Prazosin reduced interaction with the lever, a form of sign tracking. This suggests Prazosin could potentially be used in addiction rehabilitation.

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ROAD WIDTH EFFECTS ON DEER MICE (PEROMYSCUS MANICULATUS)

Alexus Banda

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Benjamin Pauli***
Discipline: ***Biology***

Presentation Type: ***Oral presentation***

Abstract:

ROAD WIDTH EFFECTS ON DEER MICE (PEROMYSCUS MANICULATUS)
Habitats are natural environments for animals, plants and other organisms and are important because they provide food, shelter, and breeding locations. Due to the destruction of habitats and habitat fragmentation, many species have been declining rapidly. Roads are one of the many causes of habitat fragmentation because they divide large habitats into smaller isolated patches and can act as a barrier to movement. It is believed some animals avoid the road itself due to the road's surface, or they avoid the traffic noise, lights, and chemical emissions. The purpose of this study was to observe the effects of roads on small mammal movement. Two roads on the Saint Mary's University of Minnesota campus were used to complete the experiment. Powder tracking was used to observe the movement of mice near each of the roads. After capturing mice in live traps they were dipped into fluorescent powder and released parallel to the edge of the road. Then, a UV flashlight was used to track their footsteps and a compass was used to determine what angle the mice traveled to after being set on the edge of the road. After analyzing the data it was found that there was a significant difference between how mice reacted to narrow and wider roads. It was found that the mice significantly avoided the wide road while they exhibited no significant reaction

to the narrow road. On average, the mice by the wide road traveled in a 60.5° direction away from the road and mice by the narrow road traveled in a 20° direction away from the road. This data suggests that roads act as a barrier to Peromyscus maniculatus but wider roads are more avoided than narrow roads. These findings are important to understand how road widths impact small mammals.

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Determination of Relative Rate Constants for Iodine Atom Abstraction by Phenyl Radicals

Emily Barthel, Cameron Scheithauer

Institution: **Winona State University**

Faculty Mentor: ***Thomas Nalli***
Discipline: ***Organic Chemistry***

Presentation Type: ***Poster presentation***

Abstract:

Determination of Relative Rate Constants for Iodine Atom Abstraction by Phenyl Radicals
Emily Barthel
Cameron Scheithauer
Thomas Nalli
Phenyl radicals (Ph·) are efficient hydrogen atom abstractors, and this reaction may have biological significance. However, rate constants for H-abstraction from biomolecules (kH) by Ph· have not been reported. Previous work from the Nalli lab used the reaction of phenyl radicals with iodoarenes (lit kI = 1.0 x 108 M-1 s-1) as a kinetic reference for measuring kH values for fatty acid esters¬. However, this literature kI value, we have come to realize, is unreliable. Our research used the photolysis of p-fluorophenylazoisobutyronitrile (FPhN=NC(CH3)2CN) to make p-fluorophenyl radicals in the presence of CCl4 and 3-iodobenzotrifluoride (ArI) at 60 °C and 22 °C. The product yield ratio of p-chloro- to p-iodofluorobenzene ([FPhCl]/[FPhI]) was measured by integration of the F-19 NMR. Plots of the yield ratio vs reactant concentration ratio ([CCl4]/[ArI]) gave excellent linear correlations. The slopes of the trendlines give the relative rate constants kI/kCl, which in

conjunction with a well-established kCl gives kI. The results at 60 °C are compared to those reported by Tanner, Reed, and Setiloane in a 1982 paper that was later retracted.

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How will you decide? An analysis of the relationship between personality and moral judgment

Bailey Benson

Institution: **Viterbo University**

Faculty Mentor: ***David Bauer***
Discipline: **P*hilosophy and psychology***

Presentation Type: ***Oral presentation***

Abstract:

Every day we are confronted with decisions where we utilize our moral code to determine an ideal course of action. My study focused on measuring moral judgment ability and analyzing certain factors of personality that could be potentially correlated with that ability. The secondary aim of my study was to analyze the relationship between perceived and measured moral judgment ability based on hypothetical scenarios. Participants in this study took a survey that consisted of the Defining Issues Test – version 2, which measures moral judgment ability, the Dunning-Kruger Scale, which measures perceived moral judgment ability, and three personality inventories: the HEXACO-60, the Levenson Self-Report Psychopathy Scale, and the Interpersonal Reactivity Index. The hypotheses for my study are that 1) perceived moral judgment will significantly differ from measured moral judgment; 2) the honesty-humility factor of the HEXACO-60 will be positively correlated with moral judgment ability; 3) psychopathy will be negatively correlated with moral judgment ability; and 4) empathy will be positively correlated with moral judgment ability. Results indicate that perceived moral judgment did not significantly differ from measured moral judgment, suggesting that participants did not misjudge their own moral judgment ability compared to their measured ability. For the comparison between personality and moral judgment, none of the three

factors mentioned in the hypotheses – honesty-humility, psychopathy, and empathy – were significantly correlated to moral judgment ability. While previous research, although limited, had found some significant relationships between personality and moral judgment, the personality factors that my study focused on do not appear to be correlated with moral decision making, potentially due to low number of participants (N=32) and lack of diversity.

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Use of microwave-assisted esterification to build research projects in organic chemistry laboratory course

Kennedy Bussan

Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Valeria Stepanova***
Discipline: ***Chemistry Education***

Presentation Type: ***Poster presentation***

Abstract:

Literature data classify undergraduate research as a high-impact practice. Many scientists report on the enhancement of the learning gains and achievement of deeper cognitive development by students. Incorporation of a research activity instead of the traditional expository experiment can help transition students from novice to experts and enhance their ownership of learning. However, one of the drawbacks of the research project is its potential to fail. Although failure is a necessary step of the success it makes it complicated for an instructor to incorporate and for a student to endure. Because of a potential failure, it is hard to identify the time necessary for the completion of research projects, especially, in a course where students are expected to develop technical hands-on skills. In addition, incorporation of an open-ended research project complicates the traditional letter grade assessment.
In this study, we report on our efforts to transform the traditional Fischer esterification experiment into a research project using microwave-assisted synthesis and single-mode microwave reactor over the course of 2 years. We will present a model and a technology that allowed 12 students to develop individual projects and complete their research project during the semester of organic

laboratory course. The collected formative and cumulative assessment will be presented to compare learning gains on the concept versus the traditional expository laboratory approach.

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An Enriched Environment Promotes Resiliency to Chronic Mild Stress

Rileigh Campbell

Institution: **Viterbo University**

Faculty Mentor: ***Dr.Charles Lawrence***
Discipline: ***Neuroscience***

Presentation Type: ***Poster presentation***

Abstract:

An enriched environment (EE) stimulates the brain by its physical, cognitive, sensory, and social interactions. Importantly, humans and animals, reared in enriched environments, are more resilient to stress. Chronic stress increases the likelihood of negative physiological changes in the brain, yet these effects are less pronounced in an enriched environment. Enriched environments will stimulate increased resiliency to chronic mild stressors by hindering the stress-related alterations in neurobiological systems. In a standard environment, these alternations are less significant and indicate that a standard environment is not able to promote the same resiliency seen in an enriched environment (Cao et. al., 2017). Brain-derived neurotrophic factor (BDNF) expression, sensitive to both EE and chronic stress, may mediate neuronal protection (Ortiz et. al., 2018). For this research, I conducted a behavioral analysis that examined behaviors in enriched and basic environments. The aim of this study was to determine if EE induced a resilient state reducing the negative impact of variable chronic mild stress. Data from the behavioral analyses showed that those in EE showed less depression and anxiety-like behaviors. The results confirmed increased performance on behavioral tasks after being housed in an enriched environment. Further role of BDNF in mediating this effect is currently being evaluated.

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Effect of Ketone Bodies on Epstein-Barr Virus Lytic Cycle Activation

Tiana Carlson (Jenna Hayes)
*indicates presenting at Seven Rivers
Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Dr. Kelly Gorres***
Discipline: ***Biochemistry***

Presentation Type: ***Poster presentation***

Abstract:

Epstein-Barr Virus (EBV) is one of the most common viruses and is the cause of mononucleosis and is associated with certain cancers. EBV has two distinct life cycles that dictate the spread of the virus. The exact mechanism of the switch between these two life cycles, the latent back to the lytic cycle, isn't fully understood. The switch between these two life cycles is important to understand because when reactivation of the lytic cycle occurs, the virus is able to replicate and spread between other cells and other individuals. Previous studies have shown reactivation of the EBV lytic cycle by sodium butyrate (NaB), which is often used as a positive control. Sodium 3-hydroxybutyrate and lithium acetoacetate both share similar structures to sodium butyrate by having both a ketone functional group and the same four carbon backbone. Because sodium butyrate effectively activates the EBV lytic cycle, this study aims to determine the effects of sodium 3-hydroxybutyrate and lithium acetoacetate on EBV lytic cycle activation due to the similarity in structure to NaB and the biological importance of these molecules as energy sources in the nutrient-deficient state (ketone bodies) and as histone deacetylase inhibitors. The expression of the BZLF1 gene (expressed when the lytic cycle is activated) will be analyzed from the DNA of cells treated with sodium 3-hydroxybutyrate and lithium acetoacetate and compared to that of the positive control and sodium 3-hydroxybutyrate and lithium acetoacetate treated with NaB to assess whether the lytic cycle was activated, inhibited, or neither. Preliminary data trials run at low

concentrations (5mM and 10 mM) of sodium 3-hydroxybutyrate and lithium acetoacetate showed no activation of EBV compared to the positive control. Higher concentrations will be tested, yet this is already an interesting difference considering the similarity in chemical structures of these molecules to NaB.

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Bat Activity in Midwest Oak Savanna Habitats compared to Forest Habitats

Keaton Cloven

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Benjamin Pauli***
Discipline: ***Environmental Biology***

Presentation Type: ***Oral presentation***

Abstract:

Midwestern oak savannas are considered one of the most threatened habitats in the world and a critically endangered ecosystem. Oak savannas are defined to have a tree cover between 30-50% and a diverse plant community. In the Midwest, most oak savannas are managed by fires or mechanical thinning to keep the plant community within oak savanna conditions. Bat populations are also facing decline due to habitat degradation from urbanization, deforestation, wind farms, and white-nose syndrome. In the Midwest, understanding bat occupancy and use of oak savannas is minimal. In this study, bat activity was compared between an oak savanna habitat and forest habitat to determine if oak savannas provide quality habitat for bat populations. Non-invasive stationary acoustic sampling using bat detectors/recorders was used to collect data in the two locations. Species richness, diversity, frequency of activity, and intensity of activity by bats were calculated for each site. The results indicated that oak savannas were used by more species of bats, but not more actively by frequency or intensity than bats in forest areas. A number of bat species have been previously found to occupy sites with lower tree density and managed in savanna conditions. A total of seven bats were recorded, five were only found in the forest habitat while all seven were seen in the oak savanna. This difference could be because heterogeneous habitats

made available by thinning and burning might provide a greater range of roosting and foraging habitats for different types of bat communities. However, while there is more richness and diversity in bat species in oak savanna habitat, the activity between the two was the same. It could be possible that while the oak savanna and forest habitat had different tree density/ cover the gaps and openings could be similar and provided the similar edge habitat complexity inviting bats to show similar activity in each habitat.

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The Ethics of Censorship: An Analysis of the MPA Film Rating System

Madison Davis

Institution: **Viterbo University**

Faculty Mentor: ***Jason Howard***
Discipline: ***Ethics***

Presentation Type: ***Oral presentation***

Abstract:

Media continues to increase its influence on all aspects of our lives. With the growth of social media, the opportunities to share information and creative content have grown immensely. The topic of censorship in relation to this information has been a highly controversial and debated issue throughout history and remains so today. This research explores film censorship from an ethical perspective using the Four Ways of Ethical Thinking as developed by Dr. Kyte in his book An Ethical Life (2012). This is accomplished through an analysis of the current film rating system utilized by the Motion Picture Association. Using the lenses of truth, consequences, fairness, and character, this voluntary system of film rating is analyzed to determine if it may be considered ethical.

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The Comparison of Insect Diversity Between Ecosystems Using Blacklight Trapping

Ryan Ellingson

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Ted Wilson***
Discipline: ***Biology***

Presentation Type: ***Oral presentation***

Abstract:

Insect diversity is key for any ecosystem to thrive due to it setting the biological foundation for that specific ecosystem. In the eyes of entomologists, blacklight trapping is considered very useful and is an effective way to collect nocturnal insects. These UV lights release different wavelengths of light to attract night flyers. In this study two blacklight apparatuses were built and placed in four different ecosystems. The collected specimens were then preserved by placing them into plastic bags and stored in a conventional freezer for a later date. Overall, due to the collection process occurring late in the season, a lower number of species were collected compared to previous studies completed in the summer. A total of 10 orders, 94 species, and 837 organisms were collected. The Diptera and Lepidoptera were the most common orders. Of the four different ecosystems, the marsh was the most diverse. The woods vs. field had the most similarities among the species present.

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Study of stability of asymmetric ACPE-based curcuminoids

Kyle Faivre

Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Dr. Valeria Stepanova***
Discipline: ***Chemistry***

Presentation Type: ***Poster presentation***

Abstract:

Curcumin is a small natural product that is the main active ingredient in the spice turmeric. Curcumin and synthetic analog curcuminoids have several medicinal properties of interest including anti-inflammatory, anti-oxidant, and anti-viral. These compounds have limited solubility in water. Therefore, in order to study these biological properties, small amounts of pure curcumin(oid) samples need to be dissolved in either ethanol/water or DMSO/water mixtures. Curcumin(oids) are known to have notoriously poor solubility which is combated by ramping up the temperature of the solvent. In my previous work in synthesizing curcuminoids, I have discovered the tendency of certain curcuminoids to decompose at high temperatures as well as the ability to break down in solutions. This breakdown often resulted in half-curcuminoids and the starting aldehyde which is often toxic and detrimental to the biological study. To ensure that biological studies are representative of the whole compounds I present here a summary of my preliminary work on gauging the decomposition and the effect of high temperatures on curcuminoid structure by evaluating 1H NMR spectra at various temperatures and time intervals. The intellectual merit of my work is the increase of scientific awareness of solvent-driven decomposition of curcuminoids. The broader impact of the study is providing insights into good practices when studying the biological properties of curcuminoids.

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A Genetic Screen Identified That Loss of NUP155 Suppresses Neurodegeneration in C9ORF72-ALS and FTD

Dildora Farhatova (Ke Zhang)
*indicates presenting at Seven Rivers
Institution: **Waldorf University**

Faculty Mentor: ***Junli Gao***
Discipline: ***Biology***

Presentation Type: ***Poster presentation***

Abstract:

Background:
Amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD) are two fatal neurodegenerative diseases with no curative treatment. ALS is characterized by degeneration of upper and lower motor neurons, whereas FTD is characterized by frontotemporal lobar degeneration. A GGGGCC (G4C2) hexanucleotide repeat expansion (HRE) in C9ORF72 is the most common genetic cause of familial ALS (40%), some sporadic cases (8%) and 25% FTD (referred to as c9ALS/FTD). The pathogenic mechanism of c9ALS/FTD is unclear. While the G4C2 HRE can cause loss of C9ORF72 function, most evidence supports a gain of toxicity mechanism. So far, two non-exclusive gain of toxicity models have been proposed and are still under debate: 1) The bi-directionally transcribed repeat RNAs can form guanine-quadruplex secondary structure, which binds to and sequesters RNA-binding proteins; 2) The repeat-containing transcripts undergo repeat-associated, non-ATG (RAN) translation, producing dipeptide repeat proteins (DPRs), which are toxic. Out of five DPRs, poly(GR) and poly(PR) proteins are particularly cytotoxic. Protein aggregation plays a key role in ALS and FTD. A pathological hallmark of these diseases is the aggregation of TAR DNA binding protein 43 (TDP-43), fused in sarcoma (FUS), some heterogeneous nuclear ribonucleoproteins (hnRNPs), etc. Stress granules (SGs) are membrane-less, RNA/protein condensates assembled when cells experience cellular stressors. SG assembly involves liquid-liquid phase separation (LLPS) by proteins with low complexity sequence domains (LCDs), including TDP-43, FUS, and other heterogeneous nuclear ribonucleoproteins (hnRNPs). These proteins are implicated in ALS/FTD, including c9ALS/FTD.

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Objective:
Inhibiting stress granules are a great promise for therapeutic development. We propose to screen 373 known genes/proteins involved in stress granule formation. We expect a loss of these genes to suppress neurodegeneration.

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Comparative Effectiveness of a Standard Dietary Intervention and Dietary Intervention Incorporating a Cheat Day

Delaney Gresser, Katrina Johnson

Institution: **Viterbo University**

Faculty Mentor: ***Maria Morgan-Bathke***
Discipline: ***Nutrition***

Presentation Type: ***Oral presentation***

Abstract:

Research suggests that incorporating cheat days into one's diet may improve weight loss attempts and potentially cardiometabolic parameters. In the current study, we recruited 11 participants: five in the standard dietary intervention group and six in the dietary intervention with a cheat day group. Participants had to be 18-55 years old and had to have a BMI of 23-40. Over eight weeks, participants met with study investigators weekly via zoom and received nutrition education and counseling for either the standard dietary intervention or the dietary intervention with cheat day. Participants tracked their intake by using MyFitnessPal. Results showed a greater weight loss in the standard dietary intervention with cheat day; with an average weight loss of 7.27 lb. The standard dietary intervention had an average weight loss of 3.58 lb . Overall, the average weight loss was 5.59 lb. There is not currently enough evidence to recommend incorporation of the cheat day. For future research studies comparing standard dietary intervention and standard dietary intervention with incorporation of a cheat day, following cardiometabolic parameters such as blood pressure and lipids could provide more evidence to support incorporation of a cheat day.

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Statistical Analysis of Dietary Factors Affect on Body Mass Index

Kacie Gross

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Maria Morgan-Bathke***
Discipline: ***Diet and Nutrition***

Presentation Type: ***Poster presentation***

Abstract:

It is well established that dietary intake plays a significant role in body composition and thus body mass index (BMI). However, it remains to be elucidated which dietary components have the most profound impact on weight status. This study looked at various dietary factors and their impact on BMI. Dietary data was collected utilizing the Viocare Food Frequency Questionnaire completed by 135 individuals and was statistically analyzed using R-Studio. Specific factors analyzed included choline, cysteine, sodium, cholesterol, calories, caffeine, and omega 3. These 7 variables and their effect on individual BMI and weight categorization based on BMI were assessed by running statistical tests such as linear regressions, Pearson correlation, and ANOVA's. All dietary factors were found to be statistically significant for individual BMI, which suggests that each variable likely contributes to a percentage of BMI variability. All factors aside from sodium were found to be statistically significant between the different weight categorizations, suggesting that there was a difference in consumption amounts of the dietary variables between weight categorizations. The findings in this study influenced a current study that looks at the use of a daily dietary choline supplement and analyzes its effects on individual BMI.

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Correlations of Serum Ketone Bodies and Grey Matter in Patients Across the Alzheimer Disease Spectrum

Sierra Harper-Beutel

Institution: **Viterbo**

Faculty Mentor: ***Kelsey McLimans***
Discipline: ***Dietetics***

Presentation Type: ***Poster presentation***

Abstract:

Alzheimer's Disease (AD) continues to affect a large portion of today's aging population. Although there are genetic risk factors, healthy individuals may also develop this neurodegenerative disease. Our research aimed to assess the potential benefits that ketosis has on stopping the progression of AD. Our study looked at brain nutritional biomarkers, specifically Beta-hydroxybutyrate (BHB) and Acetoacetate (AcAc), and how their concentrations in different areas of the brain correlate with AD status. We utilized Alzheimer's Disease Neuroimaging Initiative data and their associated brain images to determine correlations between specific brain biomarker concentrations and their structural grey matter differences. We obtained baseline data and conducted statistical analysis using SPM-12. Our research showed higher levels of BHB were correlated with less grey matter in a cluster in the cerebellum. The cerebellum is responsible for cognition and emotion, and further affects planning, execution and the control of movements. Further research has indicated that higher levels of BHB helps improve brain functions related to memory, language and global cognition. Altogether, being in a state of ketosis may help halt the progression of AD and it's related symptoms by supplying the brain with an alternate energy source.

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CNAs: Can They Do It All?

Stephanie Hayne

Institution: **Viterbo University**

Faculty Mentor: ***Matthew Bersagel Braley***
Discipline: ***Sociology***

Presentation Type: ***Poster presentation***

Abstract:

Through this research, I examined the experience of Certified Nursing Assistants (CNAs) during the COVID-19 pandemic. I utilized convenience and snowball sampling within the Viterbo University nursing student population since most are already CNAs. Participants were given informed consent documents, then they were interviewed on their experiences during the pandemic. Six major categories were addressed in the interview: CNA background, general challenges, work/school/life balance, support, religion/spirituality, and the health care profession. Interviews were semi-structured; thus, participants were all asked a standard set of questions, and additional questions were asked when deemed necessary for the interview. From the interviews, two major themes developed. These themes were not analyzed through software, however, they were analyzed and supported by all members of the research team. The first theme was the ways in which CNAs were given support. We noticed that although many CNAs had the option to utilize formal workplace support, they opted to lean on coworkers and other CNA friends instead. Secondly, the theme of mixed emotions toward the healthcare profession was present in most interviews. Most CNAs were still enthusiastic about continuing work in the healthcare field. However, some were discouraged from continuing this work because of the unique challenges that the pandemic brought upon them. These challenges include chronic understaffing, health insurance corruption, low pay, and lack of communication.

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A Qualitative Analysis of Rural Substance Abuse Recovery

Ahna Henrickson

Institution: **Viterbo University**

Faculty Mentor: ***Stephanie Thorson-Olesen***
Discipline: ***Psychology***

Presentation Type: ***Poster presentation***

Abstract:

The purpose of this research is to examine the lived experience of achieving and maintaining recovery from substance use while living in a rural area. A consensual qualitative research approach was utilized for data collection to examine the research question, what is the lived experience of achieving and maintaining recovery from substance use while living in a rural area? Data was collected with an online questionnaire utilizing five prompts. A consensual qualitative analysis, with bracketing for biases and an external evaluator was part of data analysis for primary and secondary themes.

Key words: Substance Abuse, Recovery, Sobriety

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Targeted green Purification of Synthetic Curcuminoids

MIryah Henriksen (Kyle Faivre)
*indicates presenting at Seven Rivers
Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Dr. Stepanova***
Discipline: ***Organic Chemistry***

Presentation Type: ***Poster presentation***

Abstract:

Curcuminoids are a synthetic analog of a molecule isolated from the Curcuma Longa plant and main active ingredient in spice turmeric known as curcumin. Curcumin is a molecule that is considered non-toxic and safe by the FDA. Both curcumin and curcuminoids express highly desirable biological and medicinal properties including anti-microbial, anti-viral, and anti-cancer. A variety of purification methods of these molecules have been published but there are no side-by-side comparisons of effectiveness available. Popular procedures typically implement techniques such as column chromatography and/or multi-solvent recrystallization. While highly successful these methods are time consuming and result in the use of an abundance of solvents which proves to be costly and damaging to the environment. In our lab we seek out alternative and green methods of purification of these biologically valuable compounds without the extensive use of solvents. Here I present my preliminary work on a highly applicable, scalable, and green procedure for the purification of several types of synthetic curcuminoids.

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RESEARCH SYMPOSIUM

Ethanolic Solubility Determinations of Curcumin and Related Curcuminoids

Emily Jacob, Grace Wronski

Institution: **Winona State University**

Faculty Mentor: ***Joseph K. West, Valeria A. Stepanova***
Discipline: ***Chemistry***

Presentation Type: ***Poster presentation***

Friday, November 12, 2021

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Abstract:

Limited aqueous solubility is a common concerning aspect of curcumin with respect to its biological properties. As such, significant synthetic attention has been given to increasing the solubility of related curcuminiods (relative to curcumin itself). Despite this, there is no extensive report on the solubilities of these curcuminioids, or even curcumin itself, in aqueous and organic solvents. Bioactivity assays commonly utilize dimethyl sulfoxide (DMSO) solutions of curcumin (and related curcuminoids) to deliver the compound. This approach, while common, prohibits extension to in vitro or even in vivo studies due to the deleterious effects of DMSO. Our group has undertaken an investigation into the viability of aqueous ethanol solutions as a safer and more versatile alternative. Provided herein are our initial results in the solubility analysis of curcumin and a variety of curcuminoids in pure ethanol at 25 °C. Solubility determinations have been conducted both by gravimetric and spectroscopic methods.

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Intra and inter-device test to retest reliability of a commercially available BIA device in high school athletes

Chinguun Khurelbaatar (Chris Dodge, Brandon Merfeld, Abby Ambrosius, Jacob Erickson, Joel Luedke, Andrew R. Jagim)
*indicates presenting at Seven Rivers
Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Andrew R. Jagim***
Discipline: ***Exercise & Sport Science***

Presentation Type: ***Poster presentation***

Friday, November 12, 2021

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Abstract:

BACKGROUND: The use of commercially available bioelectrical impedance analysis (BIA) scales may offer a convenient option for assessing body composition in field-based settings. However, the reliability and validity of newer BIA devices remains unknown. PURPOSE: To assess the intra- and inter-device reliability and validity of body fat percent (BF %) and fat-free mass (FFM) values derived from a commercially available BIA scale compared to criterion measures. METHODS: Fifty-nine high school and collegiate athletes (age: 17.25 ± 2.48 yrs.; height: 1.76 ± 0.10 m;, body mass: 72.70 ± 16.12 kg; BMI: 23.29 ± 3.74kg/m2; body fat%: 16.44 ± 7.00%) completed a two-compartment, hydrostatic weighing test (UWW) and had their body composition measured twice on two separate commercially available BIA devices, (InBody H20N x2). Prior to body composition measurements, athletes had their hydration levels tested using a urine specific gravity (USG) refractometer. A USG measurement of ≤ 1.02 was required of athletes to indicate euhydration. RESULTS: Test to retest reliability for the same unit indicated strong intraclass correlation coefficients (ICC) of r = 0.994 for BF % and r = 0.997 for muscle % with SEE values of 0.11 and 0.018 %, respectively (p<0.001). Inter-device reliability yielded ICC values of r = 0.996 for BF% and r = 0.999 for muscle % with SEE values of 0.086 and 0.087 %. Regression analysis indicated a significant correlation between UWW BF % and BIA BF % of (r = 0.758, r2 = 0.578; p<0.001, SEE = 0.076%) with a mean bias of 2.19 ± 4.58% and 95% confidence intervals of 0.99,3.40 %; p = 0.001. CONCLUSION: The InBody H2ON demonstrated strong intra and inter-device reliability. There was a significant difference in BF% values derived from UWW compared to the BIA device, with the BIA device tending to underestimate BF% compared to the criterion measure.

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RESEARCH SYMPOSIUM

Investigating the role of MMP-dependent ECM remodeling during heat stress in C. elegans

Anneke Knauss, Julia Schulte

Institution: **Luther College**

Faculty Mentor: ***Brian Hiester***
Discipline: ***Biology***

Presentation Type: ***Poster presentation***

Abstract:

The extracellular matrix (ECM) is a network of macromolecules that provides structural support to surrounding cells in multicellular organisms and also serves as a reservoir of extracellular signaling molecules that allows cells to communicate with each other. The ECM is a dynamic structure, and is primarily remodeled through regulated proteolysis by two conserved families of proteins: secreted proteases called Matrix Metalloproteinases (MMPs), and their inhibitors called Tissue Inhibitors of Metalloproteinases (TIMPs). Recent research suggests that the ECM plays an important role in regulating the organismal response to environmental stress. However, whether MMP-dependent ECM remodeling plays a role in this process is unknown. To investigate the role of MMP-dependent ECM remodeling during environmental stress, we used the model multicellular organism Caenorhabditis elegans (C. elegans). We exposed C. elegans to heat shock, an environmental stress known to alter ECM structures, and then determined whether the expression of any of the six MMP genes or two TIMP genes was altered using quantitative reverse-transcriptase PCR (qRT-PCR). We found that the expression of both TIMP genes (cri-2, timp-1) was increased in response to heat shock, while the expression of one MMP gene (zmp-2) was decreased, suggesting that heat shock

results in a global decrease in MMP-dependent proteolysis. To investigate whether this altered balance of proteolytic activity reflects an important functional role in the heat shock response, we used RNA interference (RNAi) to reduce expression of one of the TIMP genes (cri-2) prior to heat shock, then determined whether this impaired heat shock survival. Our preliminary results indicate that cri-2 knockdown decreases heat shock survival, suggesting that inhibition of MMP-dependent proteolysis in response to heat shock is required for organism survival.

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RESEARCH SYMPOSIUM

Mason Bee Predation and Competition in Prairie, Orchard, and Garden Habitats

Beckett Knoke

Institution: **Viterbo University**

Faculty Mentor: ***Ted Wilson***
Discipline: ***Biology***

Presentation Type: ***Poster presentation***

Abstract:

Pollinators are important across many aspects of our lives. Most evidently, they collect and disperse the pollen that helps produce crops to feed livestock or to feed us directly. Caring for and understanding our pollinators proves to be very important as our population continues to grow. It is important to focus on our native pollinators, those that originated from the areas around us such as the Mason Bee (Osmia lignaria). These bees are quite different from what we may know about Honey Bees. Mason Bees are not social - they do not nest in hives, but rather in hollowed-out reeds, holes in trees, or unoccupied snail shells. Likewise, Mason Bees do not produce honey and do not sting. Recent studies are providing evidence that Mason Bees may actually be more efficient pollinators than Honey Bees are. These native bees emerge from their cocoons in early spring around the time of many essential crop blooms and use their pollination skills to help farmers produce be more successful in their crop production.

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The Role of Self-as-Doer in Predicting COVID-19 Mitigation Behaviors: The Mediating Effect of Intentions

Taylor Kruse, Jenna Dale, Skylar Fedoravicius, Megan Reis

Institution: **Winona State University**

Faculty Mentor: ***Dr. Amanda Brouwer***
Discipline: ***Psychology***

Presentation Type: ***Poster presentation***

Abstract:

Engaging in COVID-19 mitigating behaviors is needed to reduce its spread. Young adults have the highest number of confirmed cases (57.4%) and may be contributing to community spread. Psychosocial factors associated like those of the Theory of Planned Behavior (TPB) and identity have been found to predict health behaviors such as diet and exercise, but their role in COVID-19 behaviors has yet to be fully explored. The self-as-doer identity is a motivational identity which suggests that personal identification with a behavior (e.g., "I am a hand washer") increases motivation to engage in the specified behavior. The self-as-doer predicts COVID-19 preventative behaviors above and beyond the TPB, but it is not yet known how the self-as-doer affects COVID-19 mitigation behaviors. It may be that doer identity increases intentions to perform COVID-19 behaviors which is then associated with engaging in more COVID-19 behaviors. This has yet to be tested, however. Therefore, we conducted a study to determine whether intentions to engage in COVID-19 behaviors mediate the relationship between self-as-doer identity and COVID-19 mitigation behaviors.
Participants (N=167; Mage=19.88, SD=1.84) answered questions about intentions, self-as-doer identity for COVID-19 behaviors, and COVID-19 mitigation behaviors. A mediation analysis using bootstrapping procedures was conducted. There was a significant indirect effect of the self-as-doer identity on COVID-19 behaviors through intentions, b=.19, BCA 95%CI [.08, .31].

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Stronger doer identity was associated with greater intentions to engage in COVID-19 mitigation behaviors, which was then related to greater engagement in COVID-19 mitigation behaviors. As such, the self-as-doer identity may increase COVID-19 behaviors by increasing intentions to perform those behaviors. The current study also provides evidence that identity plays an important role in engaging in health behaviors. Further research could investigate identity in relationship to other mitigation behaviors and integrate identity into promotion efforts for COVID-19 mitigating behaviors, especially among young adults.

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RESEARCH SYMPOSIUM

Poor Outcomes of Marginalized Populations in the greater La Crosse Area

Katie Leadholm, Channing Manske

Institution: **Viterbo University**

Faculty Mentor: ***Ryan Anderson***
Discipline: ***Social Work/Public Health***

Presentation Type: ***Poster presentation***

Abstract:

This presentation will focus on two interviews with individuals who have stated what the biggest struggles are for marginalized groups in the La Crosse Area. They work closely with a large population of citizens and have seen firsthand what struggles their community is facing.

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Slimy Sculpin (Cottus cognatus) Show Greater Station Holding Ability on Larger Sediment

Avery Lettenberger

Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***David Schumann***
Discipline: ***Biology***

Presentation Type: ***Poster presentation***

Abstract:

Coldwater streams in the Driftless region of Southwestern Wisconsin are sensitive to inputs of fine sediments that limit interstitial space that is crucial to benthic fishes. Land-use practices and climate change threaten to increase the fine sediment load through overland flow. Freshwater sculpin (*Cottus* spp.) minimize energetic demands by maintaining position in flowing water by anchoring into large substrates that can be embedded. We describe the influence of embedded sediments on the station-holding abilities of Slimy Sculpin (*Cottus cognatus*). Slimy Sculpin swimming performance was measured in a 10-L Brett-type flume using an endurance protocol that measures time-to-failure. Sculpin (*n* = 80) were tested on unembedded gravel (Mean Gravel Diameter =8.3±2.4 mm, *n* = 100) and gravel fully embedded by fine-sand at eight velocity increments (i.e., 5, 10, 15, 20, 25, 30, 40, 45 cm s^{-1}). Failure time was recorded when the sculpin became impinged on the downflow grate for >10 s with a maximum time of 200 min and no longer respond to a physical stimulus. It is assumed at 200 min that the fish can sustain its position at this velocity indefinitely. Endurance was observed to be higher on the gravel substrate through trials and calculated metrics. The mean failure time at 20 m/s had a difference of 33% between the groups at 57.6 min for gravel and 38.7 min for embedded gravel. Slimy Sculpin in the region are

already under stressors from climate change and are preyed on by non-native Brown Trout (*Salmo trutta*) that are well researched. However, research focused on the risk of sedimentation on sculpin energetics are rare despite the potential negative population level effects. The distribution of Slimy Sculpin could be influenced by the landscape changes that alter sedimentation rates.

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RESEARCH SYMPOSIUM

Rainbow Numbers of Graph Products

Ethan Manhart, Joe Miller

Institution: **University of Wisconsin - La Crosse**

Faculty Mentor: ***Nathan Warnberg***
Discipline: ***Mathematics***

Presentation Type: ***Poster presentation***

Friday, November 12, 2021

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Abstract:

A graph is a collection of points which are connected by lines. For example, the Facebook graph is a graph such that every person is a point and two points are connected by a line if the two people are friends. In our research, we color each point in a graph and then look for certain rainbow structures. By rainbow, we mean every point in the structure is colored differently. An example of a rainbow structure in the Facebook graph would be if three people were all friends with each other and their corresponding points were different colors. This would create a rainbow "triangle" in the Facebook graph.
Specifically, we are looking at a certain class of graphs, which we call graph products. This research is an extension of a past undergraduate research project that says all graph products have a rainbow structure when 4 colors are used. We want to determine which graph products have a rainbow structure when using exactly 3 colors and which have a rainbow structure when using exactly 4 colors.

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RESEARCH SYMPOSIUM

Impacts of Anthropogenic Train Noise on Animal Activity and Diversity in the Bluffs of Winona, Minnesota

Abigail Mazurek

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: *Dr.* ***Benjamin Pauli***
Discipline: ***Environmental Biology***

Presentation Type: ***Oral presentation***

Abstract:

Anthropogenic noise is the sound created by humans that may affect wildlife. Anthropogenic noise can mask the important noises made by wildlife and interfere with their perception of sound. One source of anthropogenic sound is human transportation. Transportation creates a lot of this noise and, while the effects of road noise on wildlife has been studied extensively, there is little research on the impact that train noises have on wildlife. To test the effects of animal activity and diversity in response to railways and its created noise, research was conducted in the bluffs of Winona Minnesota. Observations took place over a seven-day period from June 21st to June 27th, 2021, in which six cameras were placed at two similar sites. At one site, railway noise was played from a speaker system and ran a week prior as well as throughout the observation period. This noise was that of an actual train recorded in the region and played on a time schedule similar to that of the area. To observe animal activity and diversity in response to the noise, bursts of photos were captured using 3 motion detection cameras at each site. Photos of animals were only captured at the noise site. A total of 15 individuals were captured representing 5 different species: white-tailed deer (*Odocoileus virginianus*), southern flying squirrel (*Glaucomys volans*), eastern gray squirrel (*Sciurus carolinensis*), striped skunk (*Mephitis mephitis*), and blue jay (*Cyanocitta cristata*). These

captures show that train noise may have drawn the animals to the area. Mating seasons could explain the higher number of animals attracted towards the noise due to the searching for vocal mating calls in the area. The information observed from this study could help further research on if there is an impact on animal activity after a longer period of anthropogenic train noise.

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RESEARCH SYMPOSIUM

Caring for Caretakers: Student-CNA Care During COVID as Religious Work

Megan Messa

Institution: **Viterbo University**

Faculty Mentor: ***Matthew Bersagel Braley***
Discipline: ***Ethics, Culture & Society***

Presentation Type: ***Poster presentation***

Abstract:

CNAs played a central role in the COVID response and had meaningful experiences through their work. However, relative to nurses and doctors, their experiences have not been centered in our public discussion of care for the caregivers. This research sought to understand student CNAs' experiences of COVID and its impact on their lives, specifically their religious convictions and/or worldviews. Nine Viterbo University student CNAs were interviewed with Hochschild's theory, emotion work (1979), ushering in the novel concept, religious work by researchers. Religious work explores the religious interactions between the student CNAs and their patients, as well as the personal dialogue for the student CNAs throughout COVID. While further research is necessary, religious work can be utilized now as a new way of caring for the caregivers. This may be just as simple as asking meaningful questions of those who share in our loved one's vulnerable moments of life and death.

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RESEARCH SYMPOSIUM

Synthesizing and Characterizing a Toxicant to Control Invasive Asian Carp Species

Morgan Mohler

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Michael Konkel, Dr. Kyle Backstrand***
Discipline: ***Organic Chemistry***

Presentation Type: ***Oral presentation***

Abstract:

Asian carp have invaded the Mississippi River taking over populations of native fishes, damaging property, and creating financial loss for the fishing industry. The Upper Midwest Environmental Sciences Center (UMESC) has been researching the use of toxicants to control Asian carp species. From previously synthesized compounds, I have identified a new, target compound, carried out an organic synthesis, and analyzed it with spectroscopy. The objective of this study is to create the new toxicant that is both at least 85% pure to be shared with UMESC and tested against Asian carp species in toxicity assays.

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RESEARCH SYMPOSIUM

Symptoms of Bio-Psych Aging and Demographic Characteristics of the Chinese Elderly

Alexis Mulholland

Institution: **University of Wisconsin - Eau Claire**

Faculty Mentor: ***Dr. Jianjun Ji***
Discipline: ***Sociology***

Presentation Type: ***Oral presentation***

Abstract:

Using national survey data, this project examines linkages between symptoms of bio-psychological aging of the Chinese elderly and their demographic characteristics. Inspired by The Wear and Tear Theory of Aging, Theory of Age Stratification, Theory of Social Resources, Theory of the Third Age, and the Framework about Third Age, this project tests the hypothesis that symptoms of bio-psychological aging of the Chinese elderly are associated with their demographic characteristics in terms of gender, age, marital status, fertility, and region by controlling for the effect of education and health status. Chi-square significant test is used for statistical analysis along with related indicators such as Cramer's V, Pearson's Contingency Coefficient C, Tau-b, and Tau-c. Findings show robust support to the underlying hypothesis. Of all the demographic variables, however, gender and age demonstrate greater impact on bio-psychological aging. Social and economic implications are also addressed.

Key Words:
Symptoms of Bio-Psychological Aging, Chinese Elderly, Demographic Characteristics, Theory of Third Age, The Wear and Tear Theory, Theory of Age Stratification, Theory of Social Resources

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RESEARCH SYMPOSIUM

Barriers to women in poverty meeting their health needs

Bailey Nuutinen

Institution: **Viterbo University**

Faculty Mentor: ***Tyler Flockhart***
Discipline: ***Social work/Health***

Presentation Type: ***Poster presentation***

Abstract:

The purpose of this study was to evaluate barriers that La Crosse women in poverty face and how these barriers impact their ability to meet their basic health needs. A qualitative study was conducted by interviewing two organizations in La Crosse: Planned Parenthood and Hope Restores. These interviews showed that housing, costs of healthcare, and access to healthcare were all common barriers that impaired women's ability to meet their health needs.

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RESEARCH SYMPOSIUM

Predicting the Potential Future Distribution of an Invasive Tree: A Habitat Suitability Model for Russian Olive in the Four Corners Region of the United States

Laura Pasmick

Institution: **Saint Mary's University**

Faculty Mentor: ***Dr. Benjamin Pauli & Dr. Moni Berg-Binder***
Discipline: ***Environmental Biology***

Presentation Type: ***Oral presentation***

Abstract:

Invasive species are a leading cause for biodiversity loss and habitat degradation across ecosystems. Russian olive, Elaeagnus angustifolia L., is a well-known invasive species in western North America. The tree forms thick monotypic stands along riparian edges, a common site for invaders in arid ecosystems. This study aims to provide insight on the climate indicators that allow Russian olive to thrive in the four corners region of the United States and to predict where Russian olive may occur in the future due to climate change. This study was conducted using MaxEnt software to create a habitat suitability model using the climate predictors maximum temperature, windspeed, and precipitation. The model predicted that low windspeed, low precipitation, and an average maximum temperature between 60 and 65 °F were optimal conditions for the tree. The model indicated that maximum temperature was most important in predicting suitable habitat although all three predictors influenced the model. Resulting in relatively high predictability, the model showed evidence that Russian olive habitat is to substantially decrease in the four corners region under two different future climate scenarios. As temperatures are predicted to increase in the future affecting other climate variables, such as precipitation and windspeed, the model

predicted that the four corners region of the United States will become mostly unsuitable for the invasive tree. It is unclear what the future of the species may look like beyond the four corners region. Future research should be conducted to explore abundance and range shifts of invasive Russian olive across North America.

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RESEARCH SYMPOSIUM

Institutionalized Inequality: The Rise of the Corporation and the Demise of the American Dream

Stephanie Sesvold

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Andrew Hamilton***
Discipline: ***Sociology and Economics***

Presentation Type: ***Oral presentation***

Abstract:

Some thirty years ago, the top one percent of income earners in the United States (U.S.) received 12 percent of the nation's total income. Meanwhile, according to economist Edward N. Wolff in 2017, the wealthiest one percent of American households controlled roughly 40 percent of the nation's wealth, which is higher than any point in the 50 years prior. This economic imbalance is an issue of wealth – not poverty. In evaluating the way wealth is distributed among the U.S. population, it is evident that poorer communities receive far less resources, and ultimately have very little chance of working their way up the socioeconomic ladder. This is not only an issue for the lower half of income earners, but for everyone within the U.S. Epidemiologists Richard Wilkinson and Kate Pickett conducted a large survey of medical literature to find a positive relationship between income inequality and health and social problems within economically developed nations. Social problems that were studied included homicides and violent crime, school achievement and dropout rates, teenage births, life expectancy and infant mortality, obesity, and mental illness, and of the top nations, the U.S. consistently ranked the worst. Thus, income inequality and the growing wealth gap negatively affect all people regardless of their net worth, but there are certainly groups of people that are more likely to be hurt than others. After conducting literature reviews,

examining numerous studies, and analyzing economic proposals, it is clear that the social implications of the growing wealth gap disproportionately affect minority groups throughout the U.S. However, the wealth gap has been legally instituted into the U.S. system, suggesting it can only be addressed through direct policy change. The current economic imbalance of the U.S. has not been seen for a century – right before the Great Depression – so it is crucial to act quickly and effectively to prevent another crisis central to the U.S. Economy.

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RESEARCH SYMPOSIUM

John Dewey's Aesthetic Theory: An Intersection Between Aesthetic Experience and Therapy

Andrew Sherman

Institution: **Viterbo University**

Faculty Mentor: ***Jason Howard***
Discipline: ***Philosophy***

Presentation Type: ***Oral presentation***

Abstract:

The recent growth and development of the field of art therapy has missed a necessary demographic composed of at-risk youth. The development of the field of art therapy has historically focused on the use of art as a tool of expression; however, John Dewey in his work Art as Experience has provided a more comprehensive understanding of the aesthetic experience which is necessary to develop further. John Dewey's work in the field of education was extremely influential on the development of art therapy. Dewey's model of progressive education and its heavy reliance on the arts has proven to be an effective way of educating students. The aim of this research is to prove that Dewey's aesthetic philosophy is applicable not only to the field of education, but also as a model which may prove to be useful in addressing issues faced by at-risk youth. The works of John Dewey, Leo Tolstoy, and Susanne Langer were qualitatively analyzed to provide a foundation for the further study into the application of Dewey's methods for at-risk youth. In addition, Melissa Fannin – a practicing art therapist – provided insight into the use of art as a therapeutic tool. Dewey's aesthetic philosophy provides a valuable basis for understanding the aesthetic experience as well as its beneficial effects for the individual.

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RESEARCH SYMPOSIUM

Total Light versus Total Darkness: How Chronic Exposure to Atrazine Affects the Hematopoietic System of Mus musculus

Hannah Skroch

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Debra Martin***
Discipline: ***Biology***

Presentation Type: ***Oral presentation***

Abstract:

Atrazine is a triazine herbicide that is prevalent in the Midwest region of the United States. Atrazine is heavily used in agriculture on several different kinds of crops. Atrazine is a known endocrine disruptor, has been linked to cancers and has been shown to affect the hematopoietic system. Due to atrazine's effects, the Environmental Protection Agency (EPA) has established a Maximum Contaminant Level (MCL) of 3 ppb of atrazine in public water supplies. Atrazine's effects are believed to be connected to concentration and possibly exposure time. Circadian rhythm is another factor in the endocrine system hormone release. Atrazine concentration, atrazine exposure time, and circadian rhythm all play a role in how the body functions. These variables have driven this project.

The objective of this project was to collect and compare packed cell volume (PCV) percentages from mice treated with different atrazine concentrations who were also exposed to different lighting treatments. Different lighting treatments (total light or total darkness) resulted in altered circadian rhythms. Results were gathered at 2 different exposure times (4-weeks and 8-weeks) to provide more insight on how exposure time plays a role in PCV. Two-way ANOVAs were run on the data to compare how the time samples were harvested related to the concentration of atrazine the CD-1 mice were exposed to. The results of this study revealed that with mice that had 24 hours of light for 4 weeks of exposure, there was no effect of atrazine treatment on PCV, there was no effect of the time of harvest on PCV, and there was no interaction between atrazine concentration and time of harvest. With mice that had 24 hours of darkness for 4 weeks of exposure, there was no effect of atrazine treatment on

PCV, there was an effect of the time of harvest on PCV, and there was an interaction between atrazine concentration and time of harvest. With mice that had 24 hours of light for 8 weeks of exposure, there was no effect of atrazine treatment on PCV, there was no effect of the time of harvest on PCV, and there was an interaction between atrazine concentration and time of harvest. With mice that had 24 hours of darkness for 8 weeks of exposure, there was no effect of atrazine treatment on PCV, there was an effect of the time of harvest on PCV, and there was an interaction between atrazine concentration and time of harvest.

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RESEARCH SYMPOSIUM

Genetic Transformation of Lactobacillus rhamnosus GG a Mutualistic Member of Human Microbiota

Mya Snyder

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Chris Mayne***
Discipline: ***Biology***

Presentation Type: ***Oral presentation***

Abstract:

Lactobacillus rhamnosus (L.rham) is a bacteria that naturally occurs in the intestinal microbiota. L. rham is commonly used in probiotics because of its role in inflammatory responses. The benefits from L.rham and probiotics could have a potential role in limiting symptoms of Inflammatory bowel disease (IBD). This research focused on the genetic transformation of pMEC45 into L. rham. Methods used to transform L. rham begin by making pMEC45 resistant to chloramphenicol (Cam) and isolating samples using QIA Prep Spin Minikit. A nanodrop was used to show the purity and concentrations in pMEC45 samples. A restriction digest and gel electrophoresis were run to confirm the presence of pMEC45. Electroporation was completed to transform pMEC45 into Lactobacillus rhamnosus. Growth on De Man, Rogosa and Sharpe (MRS) plates that are resistant to Cam showed that pMEC45 was successfully transformed into Lactobacillus rhamnosus GG using electroporation. Transformation of L. rham is important to further the study and manipulation of naturally occurring microbiota found in the gastrointestinal tract.

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RESEARCH SYMPOSIUM

Levels of Omega 3 and Omega 6 Fatty acids and the Occurence of Alzheimer's Disease

Anna Stone

Institution: **Viterbo University**

Faculty Mentor: ***Kelsey McLimans***
Discipline: ***Health Science***

Presentation Type: ***Poster presentation***

Abstract:

Alzheimer's Disease is becoming the leading neurodegenerative condition in the world. This research aims to answer the question: Are higher levels of monounsaturated fatty acids (MUFAs) and polyunsaturated fatty acids (PUFAs) linked to improved or increased brain volume? The data that was studied was obtained from the Alzheimer's Disease Neuroimaging Initiative (ADNI). Secondary data analysis was conducted using SPM12. The results included Higher ratio of serum omega 3 to omega 6 fatty acids was related to less GM (p<.05, FEW corrected) in several clusters (Figure 1) spanning the right precuneus, left superior frontal gyrus, and left superior occipital gyrus. This is significant, because we can adjust our nutrition therapy recommendations with these findings in mind.

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RESEARCH SYMPOSIUM

Dissecting the Lipase Inhibitory Functions of ANGPTL3 by Site-Directed Mutagenesis

Rakshya Thapa

Institution: **Waldorf University**

Faculty Mentor: ***Dr. Brandon Davies, University of Iowa and Dr. Bharat Bhattarai, Waldorf University***

Discipline: ***Biology***

Presentation Type: ***Poster presentation***

Abstract:

Lipoproteins are mode of transport for fat and lipids in blood plasma and concentration of some lipoproteins raises risk for cardiovascular diseases like heart attack, stroke, and coronary artery disease. High plasma levels of Low-Density Lipoproteins (LDL), Triglycerides (TG), and low plasma levels of High-Density Lipoproteins (HDL) are recognized as a risk factor for cardiovascular events. Endothelial Lipase (EL) and Lipoprotein Lipase (LPL) are known to regulate the plasma levels of HDL and TG. ANGPTL3 is a protein expressed in liver and is known to play an important role in EL and LPL inhibition. Overexpression of ANGPTL3 increases plasma TGs and HDL and deficiency lowers both. Therefore, the use of ANGPTL3 mutants to determine the protein residues important for inhibition of lipase activity can help us figure out if there are any ANGPTL3 mutants out there which are specific about their inhibition of Lipase activity.

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RESEARCH SYMPOSIUM

Synthesis of Curcuminoids Containing Ligands Capable of Hydrogen Bonding

Claire Trudeau

Institution: **University of Wisconsin – La Crosse**

Faculty Mentor: ***Valeria Stepanova***
Discipline: ***Organic Chemistry***

Presentation Type: ***Poster presentation***

Abstract:

Curcumin is the active ingredient in turmeric that consists of a 2-acetylacetone central linker and two side-arms of benzaldehyde derivatives. Curcumin has demonstrated high bioactive potential. Curcumin is known for its anti-cancer, anti-viral, anti-inflammatory, and anti-oxidizing effects. However, curcumin is not a good clinical candidate for two primary reasons. First off, when curcumin is ingested, it quickly decomposes due to its poor stability. Secondly, curcumin is known to have very poor water solubility limiting the absorption of the active ingredient into cells. These two factors severely hinder the biomedical application of curcumin. The biological properties of curcumin are in large part connected to the central moiety of the resulting molecule. While the water solubility of curcumin is connected to the substituents on the side arm pieces. Therefore, we present our investigation of the applicability of an acetyl cyclohexanone linker and side arms ligands that have hydrogen bonding capabilities towards the formation of curcumin-type compounds using microwave solvent-free synthesis.
The intellectual merit of my research is an expansion of the library of new asymmetric curcuminoids. The broader impact of my research is an increase in the availability of curcuminoids for biological studies.

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Views Held by Amish Community Create Obstacles in Healthcare Access

Kylie Tschumperlin, Abbey Fedie, Brielle Hammel

Institution: **Viterbo University**

Faculty Mentor: ***Robin Haugh***
Discipline: ***Nursing***

Presentation Type: ***Poster presentation***

Abstract:

Abstract: This presentation focuses on the Amish population's favorable views on self-mediated medical attention and natural remedies within their communities. Much of the Amish utilize natural remedies such as vitamins and supplements rather than modern medical interventions along with the use of professionals like osteopathic doctors and chiropractors. Their beliefs in these methods are seen with vaccines as well. COVID-19 vaccines are not taken advantage of as they are not favored within the communities. Findings revealed 5 recurring themes: many Amish individuals do not receive vaccines due to favorability for natural remedies; values upheld by Amish population inhibit healthcare access; incompetence of modern medical professionals negatively affect how the Amish receive healthcare; disconnection with the Amish and modern medicine brings doubt with receiving outside health care services; and pursuit of outside medical care is only brought on by exacerbated illnesses.

Keywords: Amish communities, healthcare access, natural remedies, COVID-19, modern medicine

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Facilitation of Masked-Face Lineups to Eyewitnesses Identifying Masked Individuals

Clarissa Van Dale

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Molly O'Connor***
Discipline: ***Psychology***

Presentation Type: ***Oral presentation***

Abstract:

Eye-witness memory is notoriously unreliable and a factor in many wrongful convictions. The Justice System needs tools that support Independent memories that are truthful and accurate. This study is intended to follow up on the work of Drs. Krista D. Manley, Jason C. K. Chan, and Gary L. Wells (2019) at Iowa State University. The team did a preliminary study on the potential benefit of ski masks in police photo lineups when participants encoded a masked face before identification. In the discussion of that study, they suggested the next step in solidifying this research would be to use real faces and a staged-crime video. This study will include those and build off of the principal research in an attempt to further our understanding of how to most accurately facilitate police photo lineups. I filmed a staged crime video and participants came in-person, watched this video followed up by a distractor video and then viewed a lineup wherein which they were asked to identify the offender from the first video. I am currently in the process of data collection.

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Postville in Perspective: Visual Ethnography in a Rural Iowa Town

Laura Weidemann

Institution: **Viterbo University**

Faculty Mentor: ***Matthew Bersagel Braley***
Discipline: ***Anthropology***

Presentation Type: ***Poster presentation***

Abstract:

This is a photo essay exhibit of my summer research in Postville, Iowa. Drawing inspiration from activist anthropologists, my work blends visual art and storytelling. Paired with each photo is a descriptive essay that situates the image in the broader social and historical context. In order to obtain a well-informed understanding of Postville and food system ethnography, I read books written by Postville residents and studies by anthropologists. Discussions with individuals from the Postville community gave me a chance to hear about personal accounts of people's lives in Postville today. In sharing reflections from my field experiences, I attempt to capture the complex history of Postville and offer a message of hope for the work ahead. The exhibit invites viewers to reflect on the human impact of their food's journey to their plate and what they can do about injustices within local, national, and global food systems.

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The effects of COVID-19 on Minor League Sports

Anthony Welch

Institution: **Viterbo University**

Faculty Mentor: ***Jim Evans***
Discipline: ***Sport Management and Leadership***

Presentation Type: ***Oral presentation***

Abstract:

The effects of COVID-19 on Minor League Sports
Anthony Welch*, Jim Evans,
Viterbo University
Over the past year, COVID-19 has emerged as a major obstacle for many businesses. As the pandemic has spread across the world, sport organizations have been forced to adapt, forcing spectators and fans to stay home due to safety reasons. With these key sources of revenue removed, the process of maneuvering the pandemic became even more difficult. Although many professional sport organizations have navigated the challenges posed by COVID-19, minor league sport organizations are still struggling. Therefore, the purpose of this study was to examine effects that COVID-19 had on minor league sport organizations in order to better understand what strategies they can potentially use to help navigate and respond to the pandemic. Overall, research was conducted through several semi-structured interviews by using a snowballing sample method. Interviewees include executives, senior managers, and owners of minor league sports franchises. Following the conclusion of these interviews, a thematic analysis was utilized to identify potential trends that were successful for sport organizations to navigate COVID-19. Ultimately, our findings indicate that many minor league organizations had their main source of revenue, ticket sales, effected in a through limited stadium capacity. Additionally, all interviewees note the adoption of secondary forms of revenue that utilize their stadiums in order to create a sense of community. Examples include movies in the ballpark, hosting little league baseball games, and farmers markets. Interestingly, nearly all participants state that the costs consumers incur did not have to

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increase due to COVID-19. These findings will be crucial for minor league sport organizations as they attempt to find long-term sustainability after COVID-19.

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