NCUR 2021 Proceedings

Are Self-affirmation Interventions Effective in Reducing Excessive Exercise Behavior?

Psychology - Time: Wed 3:00pm-4:00pm - Session Number: 7110
Pang-Yia K. Vick-Xiong, Victoria L. Schantz, Jackie Paulsen, Jonathan Ochoa, Dr. Erin Hillard, Department of Psychology, University of Wisconsin - Parkside, 900 Wood Rd, Kenosha, WI 53144
Pang-Yia Vick-Xiong, Jonathan Ochoa

The purpose of the current study is to assess the effect of an online self-affirmation intervention on excessive exercising behavior and attitudes as well as body image-related outcomes among college men and women. Excessive exercise is tied to an intense drive to control body image and weight along with acting as a mood enhancer for many people. Research suggests that those who over-exercise are more likely to develop an eating disorder, experience behavioral abnormalities, and have increased suicidal tendencies. Current research suggests that both men and women engage in excessive exercise behavior, though past prevention and intervention research has largely focused on college women. The current study attempts to apply a well-validated psychological intervention to a relatively understudied domain of health-related behavior to decrease both college men's and women's excessive exercise behaviors and attitudes. Our participants are undergraduate students at a mid-sized, Midwestern university, solicited from introductory and other psychology classes. Eligible participants are randomly assigned to either a self-affirmation-based manipulation or a neutral control condition. Following the intervention (or control condition), all participants read a newsletter about excessive exercise and associated risks, and complete a follow-up questionnaire assessing their attitudes toward excessive exercise and intentions to reduce or avoid engagement in overexercising. We expect to find evidence supporting the use of self-affirmation interventions in the prevention of excessive exercise behavior in college men and women. We hypothesize that men and women who undergo the self-affirmation intervention will show reduced intentions to engage in excessive exercise behavior as well as less positive attitudes toward excessive exercise in the future. Findings will be discussed in the context of current prevention strategies targeting excessive exercise and body image, as well as the importance of including men in prevention and intervention research in the field of disordered eating research.

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a follow-up questionnaire assessing their attitudes toward excessive exercise and intentions to reduce or avoid engagement in overexercising. We expect to find evidence supporting the use of self-affirmation interventions in the prevention of excessive exercise behavior in college men and women. We hypothesize that men and women who undergo the self-affirmation intervention will show reduced intentions to engage in excessive exercise behavior as well as less positive attitudes toward excessive exercise in the future. Findings will be discussed in the context of current prevention strategies targeting excessive exercise and body image, as well as the importance of including men in prevention and intervention research in the field of disordered eating research.

Characterization of a Mutant in Alga Chlamydomonas reinhardtii that is Tolerant to Low Nitrogen

Biology - Time: Wed 3:00pm-4:00pm - Session Number: 1107

Jared L. Mayrand, David C. Higgs, Department of Biological Science, University of Wisconsin–Parkside, 900 Wood Rd, Kenosha, WI, 53144
Jared Mayrand

Nitrogen is an element that is incorporated into a variety of biomolecules necessary for all life. Green algae grow at a dramatically reduced rate in a depleted nitrogen environment. They also undergo significant metabolic changes during nitrogen stress, to both scavenge nitrogen from other cellular molecules and induce gametogenesis. We have recently reported a new mutant strain of the model eukaryotic green alga Chlamydomonas reinhardtii, which we termed TLN1, that grows approximately 55% better and with more biomass than a wild-type control in growth media containing 90% less nitrogen. The TLN1 strain is of interest for it might improve growth and save using high amounts of nitrogen fertilizer, at a costs savings, for the production of algal-based renewable biofuels as well as possible pharmaceuticals and natural products. Identifying the causative genetic mutation in TLN1 is critical, and it may lead to applications in other algae and possibly crop plants to significantly reduce use of nitrogen-based fertilizers. To determine the genetic mutation in TLN1, Pacific Bioscience long-read next generation sequencing is being performed on the TLN1 strain and compared to an isogenic wild-type strain. Results from genomic sequencing analysis will be presented. Secondly, we are testing if nitrogen stress induces TLN1 to produce similar or higher amounts of Triacylglyceride (TAG) lipids, which can be used as biodiesel for industrial purposes. Initial tests indicate that TLN1 accumulates TAGs at an increased rate compared to wild type, when grown under nitrogen stress. Future experiments will compare the growth of TLN1 to WT in high and low light intensities as well as other methods to assess changes in nitrogen metabolism that allows TLN1 to grow better in low nitrogen.

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Effects of Trophic Pressures on Nocturnal Activity in Wisconsin Microbats (Chiroptera: Vespertilionidae)

Ecology - Time: Tue 12:30pm-1:30pm - Session Number: 4118

Grace Wampole, Kyle Bergendahl, Zachary Williams, Mitchell Anderson, Shannon O'Malley, Dr. Catherine Mossman, Dr. Jessica Orlofske, Department of Biological Sciences, University of Wisconsin - Parkside, 900 Wood Rd, Kenosha WI 53144
Grace Wampole, Kyle Bergendahl

Bats are susceptible to opposing ecological pressures as both prey and predators. "Lunar phobia" may decrease bat activity time during periods of strong lunar illumination to avoid predation by raptor species. However, many insects are positively phototactic and exhibit greater activity with lunar illumination. Bats must respond to these conflicting pressures. We predicted a positive correlation between bat and insect activity during the first and third quarter moon phases with strong negative correlations during the new and full moon. To test this, we collected paired arthropod samples and bat recordings at dusk for nine 60-minute sampling events between May-August 2019 at two wooded sites in Racine Co., WI. Quantitative arthropod samples were collected using light traps at both sites. Bat calls were recorded using a Baton bat detector attached to a voice recorder. Bat call analyses were completed using the freeware program, Audacity. The recordings were assessed and cleared of background noise in order to quantify the number and duration of each echolocation call. Arthropods collected were identified to family using taxonomic keys and cross-referenced to publications on bat diet and foraging behavior to evaluate food quality. Using a Pearson correlation, there was a strong positive correlation (64.11%) between insect richness and percentage of microbat activity as well as a positive correlation (56.95%) between bat activity and percentage of the moon visible for each date which is contrary to the "lunar phobia" hypothesis. We observed a trend in increased microbat activity when there was an increase in arthropod richness and abundance; however, more data is needed to address outside factors. Understanding how bats and their insect prey respond to natural illumination can be used to predict the impact of light pollution on food web dynamics.

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Fatty Acid Kinase Structure and Function Relationships

Biology - Time: Mon 4:30pm-5:30pm - Session Number: 3162
Hannah Gross, Brian Weinzirl, Maxwell Bachochin, Brittany Dobrowski, and Robert Barber, Department of Biological Sciences, University of Wisconsin-Parkside, Room 375 Greenquist Hall, 900 Wood Rd, Kenosha, WI 53141-2000
Hannah Gross

Assorted short chain and medium chain fatty acids are end products of dietary fiber fermentation by intestinal microbiota. These fatty acids are known to exert multiple beneficial effects on mammalian energy metabolism, such as being a valuable carbon and energy source for colonocytes as well as boosting immune responses. Understanding the enzymes involved in the production and utilization of fatty acids is important for deciphering these beneficial effects and the underlying metabolic principles among gut microbiota. One pathway for fatty acid metabolism relies on the concerted efforts of two distinct enzymes, a fatty acid kinase and an acyltransferase. Our laboratory is examining a variety of natural enzyme variants of fatty acid kinases in an effort to understand nuances in substrate specificity among disparate enzymes. Biochemical and computational analyses have been performed for fatty acid kinases from Rhodobacter sphaeroides, Desulfovibrio vulgaris str. Hildenborough, and Bacteroides vulgatus, which exhibit amino acid substitutions predicted to be involved in fatty acid binding. In vitro studies using purified enzymes, which have been heterologously produced in Escherichia coli, have determined kinetic constants for a variety of fatty acid substrates among these different enzymes, as well as produced interesting results regarding substrate protection and thermostability. In silico protein structure model building along with computational ligand binding studies have contributed substantial insight regarding our interpretation of these biochemical results. In particular, identification of amino acids contributing to oligomerization and surface loops involved in substrate binding has generated an improved view of the acyl-binding pocket of these enzymes as well as enhanced perspective concerning the evolution of their novel metabolic roles within these bacteria.

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Growth and Structural Properties of Heterostructure of (110)-oriented YBa2Cu3O7 Superconductor and (110)-oriented PrBa2(Cu0.8Ga0.2)3O7 Electrical Insulator

Physics/Astronomy - Time: Wed 12:00pm-1:00pm - Session Number: 6163

Julia Jones, Hom Kandel, Physics, University of Wisconsin - Parkside, 900 Wood Rd, Kenosha, WI 53144. Nathan Arndt, Materials Science and Engineering, University of Florida, 549 Gale Lemerand Drive, PO BOX 116400, Gainesville, FL 32611. Jungwoo Lee, Materials Science and Engineering, University of Wisconsin - Madison, 264 Materials Science and Engineering Building, 1509 University Ave, Madison, WI 53706. Chang-Beom Eom, Materials Science and Engineering, University of Wisconsin - Madison, 264 Materials Science and Engineering Building, 1509 University Ave, Madison, WI 53706. Hom Kandel, Physics, University of Wisconsin - Parkside, 900 Wood Rd, Kenosha, WI 53144.
Julia Jones

We performed epitaxial thin film deposition of a heterostructure of (110)-oriented YBa2Cu3O7 Superconductor (S) and (110)-oriented PrBa2(Cu0.8Ga0.2)3O7 electrical insulator (I) using a pulsed laser-based thin film deposition technique for the nanofabrication of an S-I-S tunneling Josephson junction device. This device may operate with a simple low-cost liquid nitrogen-based cryogenic system and has potential applications in superconducting quantum interference device based bio-magnetic sensors, quantum computing, and high-frequency detectors.

X-ray diffraction measurement, atomic force microscopy, and low-temperature electrical resistivity measurement were performed to study the structural and electrical transport properties of the heterostructure. Here, we discuss our process for the deposition of a high-quality heterostructure and present our experimental results on the structural and electrical transport properties of the heterostructure.

Funding Acknowledgement: This work was supported by WiSys and UW System Applied Research Grant #102-4-812000-AAH1775 (2019-2021).

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Hydrogeologic Assessment of the Kenosha Dunes

Geography/Geology - Time: Tue 3:30pm-4:30pm - Session Number: 5079
Kristen Carlson, Daniel Kerstan, Benjamin Sieren and Advisor Dr. John Skalbeck, Department of Geosciences, University of Wisconsin – Parkside, 900 Wood Rd, Kenosha, WI 53144
Kristen Carlson, Ben Sieren , Daniel Kerstan

The Kenosha Dunes complex within Chiwaukee Prairie State Natural Area in southeastern Wisconsin has recently experienced rapid shoreline erosion due to high water levels in Lake Michigan. A hydrologic assessment was initiated in November 2019 to evaluate the impact of groundwater flow and bluff seepage on the erosion. Monitoring wells PZ-1 and PZ-2 were installed between the erosion bluff and a wetland west of the dunes to measure groundwater elevations using dedicated pressure transducers. Water samples from the wetland, the two wells, and the bluff seepage were collected for measuring field water quality parameters and for analysis of general chemistry at the UW–Parkside SC Johnson Integrated Science Laboratory. Laboratory water chemistry results show a steady decline in sodium and chloride from the wetland toward the bluff suggesting the wetland serves as a source for groundwater recharge. Sieve analysis was conducted on cuttings from the well installation and from bluff samples to characterize grain size distribution and estimate the hydraulic conductivity. Aquifer slug tests at the two wells were performed to calculate the hydraulic conductivity as well. Agreement was found in the hydraulic conductivity values obtained from the two methods to yield an average value consistent with dune sands. An analytical model was created using Microsoft Excel to simulate groundwater elevations using local annual rainfall data for model recharge, the average hydraulic conductivity for aquifer transmissivity, and water level elevations from the wetland, the two wells, and the bluff seepage. Model water elevations show good agreement with measured groundwater elevations and mimic the elevations consistent with the Dupuit–Forchheimer assumption for unconfined flow with a high hydraulic gradient adjacent to the bluff seepage. The model can be used to simulate changes in hydraulic gradient and associate seepage flow with continued bluff erosion.

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Insight and Analytics from Git Repositories

Computer Science - Time: Wed 1:30pm-2:30pm - Session Number: 1014
Jordan Brekke, Yan Berezkin, Timothy Guilfoyle, Victor Huarota, Zaid Altahat, Computer Science Department, University of Wisconsin Parkside, 900 Wood Rd, Kenosha, WI 53144
Jordan Brekke, Yan Berezkin -
Timothy Guilfoyle -
Victor Huarota -
Zaid Altahat -

Git Repositories serve a major role for software developers, and their collaborative nature necessitates strong and efficient communication. To aid development teams' ability to access and to interpret data about their repositories, we have been developing an application that extracts the raw data associated with the commits made to a repository and displays charts that allow a user to view various statistics, such as bar graphs showing how often authors commit changes relative to all contributing authors of the repository. As a demonstration of our application, we examined the Amazon Web Services Shell to gain insight into the repository's most important files, the expected times for commits to occur, and the authors who contributed the most to the project. We expect our application's visualizations to help both experienced and newer Git users, providing more in-depth insights to developers regarding their repositories and assisting new users in developing a foundation upon which to build their understanding of Git. Finally, the application is a work-in-progress, but the foundation has been laid and we plan improvements to the application's insights, such as commit comparison, in the future.

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Molecular Phylogeny of a Potential New Species in Rhipidocladum, a Genus of Mexican Woody Bamboo

Biology - Time: Mon 4:30pm-5:30pm - Session Number: 3160
Ariana Hernandez, Dr. Christopher Tyrrell, Botany, Milwaukee Public Museum 800 W Wells St. Milwaukee, WI 53233 Ariana Hernandez, Dr. Jessica Orlofske, Department of Biological Sciences, University of Wisconsin-Parkside College of Natural Health Sciences in Greenquist 900 Wood Rd.

Kenosha, WI 53144
Ariana Hernandez

We examined the possibility of a new species of Mexican woody bamboo in the genus *Rhipidocladum* using DNA sequence data to confirm its disimilarity from other *Rhipidocladum* species and related genera. Recent research found an entirely new genus of bamboo that was thought to be related to *Rhipidocladum*. This genus was overlooked based on physical characteristics but revealed with genetic data (Tyrrell et al. 2018). Here, we performed a similar procedure to test for a possible new species. The four chloroplast DNA markers: *ndhF, trnC-rpoB, trnD-trnT, rps16-trnQ* and three nuclear markers *pabp1, gpa1, and pvcel1* are to be analyzed to determine the classification of the new species relative to the two most morphologically similar species: *Rhipidocladum bartlettii* and *R. martinezii*. Using DNeasy Plant Mini Kits, DNA was extracted and amplified. Preliminary results were compiled using sequence data from Triplett et al. (2014) to create three phylogenetic trees from the genes *pvcel1, pabp1, and gpa1*. The new DNA sequences will be added to the phylogeny once they have been sequenced. The three trees were created using RAxML on the online public platform CIPRES. These trees will serve as a framework to look at the evolutionary position of the sequences from the putative new species and the two related species of Mexican woody bamboo. The comparison will help determine how closely related the bamboos are to each other and determine if *Rhipidocladum bartlettii, R. martinezii* and the target bamboo are all separate species and belong to the genus *Rhipidocladum*.

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Monitoring Aquatic Invertebrate Biodiversity of Restored Coastal Wetlands

Biology - Time: Mon 4:30pm-5:30pm - Session Number: 3161
Authors and Presenters: Gwendolyn Richardson (email: richa082@rangers.uwp.edu/phone: (262) 379-0499/address: W4731 Remer Road, Elkhorn, Wisconsin 53121) Eli Cortez (email: corte017@rangers.uwp.edu/phone: (262) 994-5330/address: 1907 5 Mile Road, Racine Wisconsin 53402) Hannah White (email: white141@rangers.uwp.edu/phone: (414) 333-9309/address: W265S8620 Rustic View Lane, Mukwonago, WI 53149) Student Co-Authors: Katherine Loesl-Dunk Faculty Mentor: Jessica Orlofske (orlofske@uwp.edu) Institution: University of Wisconsin-Parkside 900 Wood Road Kenosha, WI 53141-2000 Department: Department of Biological Sciences
Gwendolyn Richardson, Eli Cortez, Hannah White

Aquatic invertebrates contribute to key environmental processes such as nutrient cycling and water purification. Aquatic invertebrates also sustain organisms occupying higher trophic levels through the food web. Thus, an examination of aquatic invertebrates can provide insight into the ecological condition of the ecosystem. Evaluating the health of wetland ecosystems has become critically important in recent years with land development, pollution, climate change, and other anthropocentric pressures threatening these valuable habitats. For this reason, urban wetland complexes, such as Samuel Myers Park (SMP) and North Beach Park (NBP) located on the Lake Michigan shoreline in Racine, Wisconsin, have been restored to improve fundamental ecosystem functions and ensure wetland integrity. In this study, we used aquatic macroinvertebrates as bioindicators of the ecological condition for these wetland ecosystems. We collected quantitative dip net samples of invertebrates and complementary water quality data (pH, temperature, dissolved oxygen, and conductivity) with a multiparameter probe at one natural and two constructed wetlands located at SMP twice during the summer of 2018, 2019, and 2020. Similar sampling was performed at the man-made, nine-chambered wetland and stormwater retention pond at NBP during the summer of 2019 and 2020. Invertebrate samples were preserved in 70% ethanol and processed in the laboratory using a dissecting microscope. Invertebrates were identified to the lowest taxonomic level possible, and the abundance was recorded. We observed an increase in invertebrate taxa richness and diversity for all wetlands sampled between 2018-2019. We anticipate a further increase in diversity and abundance of sensitive invertebrate taxa as colonization of the restored wetlands continues. Additional sampling will assist with long-term management of these critical coastal wetlands.

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Perceiving the Gist of Auditory Information at Brief Exposures

Psychology - Time: Wed 3:00pm-4:00pm - Session Number: 7099
Megan Schulte, Holly Ambruso, and Dr. Melissa Gregg, Department of Psychology, University of Wisconsin-Parkside, 900 Wood Road, Kenosha WI 53141-2000
Megan Schulte, Holly Ambruso

Research in the visual perception literature has revealed that human observers can perceive the gist of a

visual scene in as little as a quarter of a second. This body of literature has indicated many global image features that human observers use to perform a quick analysis of visual gist, such as degree of openness. While the research on visual gist perception has provided information on how human observers perceive and recognize visual scenes, there is no corresponding research on auditory gist perception. The purpose of this study was to determine whether observers could use global sound features to complete a rapid categorization task with environmental sound stimuli. In Experiment 1, participants rated a set of 200 environmental sounds on four global sound features: degree of animacy, degree of density, degree of movement, and degree of naturalness. Participants completed their ratings on a scale of 1 to 7, with 1 being the lowest degree and 7 being the highest degree. In Experiment 2, participants were required to detect whether a target was present in a sequential series of three sounds that were similar or distinct in global sound features (animacy, density, movement, naturalness). There were 100 target present trials and 100 target absent trials. The results of Experiment 1 indicated that environmental sounds differ in degree of animacy, density, movement, and naturalness. The results of Experiment 2 revealed that participants were slower and less accurate on trials in which the sounds were similar on a global sound feature, which indicates that the global sound features were more influential on perception than the basic level category information. These findings suggest that auditory gist perception is a remarkably rapid process, and that observers use global features that are related to the ecological properties of scenes to extract auditory gist information.

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