The Ohio State University at Lima

Undergraduate Research Forum

April 5, 2017

Library, 12:00-2:00

THE OHIO STATE UNIVERSITY

LIMA

Purpose

The Lima Campus Undergraduate Research Forum is designed to encourage students to actively engage in research. Beyond the Lima Campus Forum, participation in the Denman Undergraduate Research Forum, the University Libraries Research Prize, or publication in JUROS are all strongly encouraged, although faculty and students are welcome to pursue any appropriate forum for their discipline that will showcase undergraduate research.

Thank You

We would like to thank Dean Gilbert for her support of this Forum. Thanks also to the support given by the Student Life.

PROGRAM

1. **Stephanie Hempfling** - *The Effect of Diet on Avian Cecum Size and Intestinal Absorbancy Rate*
2. **Erin Place** - *Variation in Organ Size Between Migratory and Non-Migratory Birds*
3. **Adnan Siddique** - *A Comparison of Bird Digestive Systems by Diet*
4. **Hannah L. Downer** – *Determining A New Evolutionary Divergence Date for Mus-Rattus*
5. **Adriana N. Jurich, Nelish Pradhan, C. William Kilpatrick** – *Recovering the Evolutionary History of the Humped-nose Mice (Hybomys) and Relatives using the IRBP gene*
6. **Kathryn Wuebker** – *because he loves me*
7. **David Braun** – *Actual Use Assessment of a Healthy Corner Store Intervention*
8. **Emily Rose Allen** - *Exploring Expressive Writing to Reduce Test Anxiety on an Introductory Psychology Exam*
9. **Katharine N. Black** - *Meditation-Focused Attention, Hypnotic Susceptibility, and Problem Solving*
10. **Olivia J. Green** - *Exploring Links Between the HGSHS:A, Wessex Dissociation Scale, and the Dissociative Processes Scale*

ABSTRACTS

Stephanie Hempfling

Faculty Sponsor: Dr. Jacqueline K. Augustine (Department of Evolution, Ecology, and Organismal Biology)

The Effect of Diet on Avian Cecum Size and Intestinal Absorbancy Rate

The morphology of bird's intestines and cecum critically impact their survival and reproduction because intestinal morphology affects nutrient absorption and enzymatic breakdown of nutrients. The purpose of this study is to determine if birds with a herbivorous diet have a well-developed ceca and faster intestinal absorbancy rate compared to insectivores or omnivores. The birds were salvaged, frozen, thawed and then weighed before skinning. The mass of the cecum (if present) and intestine was measured and both were expressed as a percent of the body mass. We developed a new 'sausage' method to determine absorbancy rate of the intestine by filling a segment of the intestine with cornmeal, sealing the ends of the intestine, placing the 'sausage' in water, and recording the change in mass at regular intervals. Intestinal absorbancy was defined as the slope of a regression of time and mass. The diet of the birds was based on gizzard contents and literature. Logistic regression was used for cecum analysis with the independent variable as diet and binary order (Passeriformes or non-Passeriformes), and the presence of a cecum was the dependent variable. Mixed effect model was used to analyze the intestinal absorbency, percent mass of 4-centimeter intestine, and percent intestine + cecum as dependent variables, and the independent variables were diet as a fixed effect and binary order as a random effect. Presence of a cecum related to binary order, but not diet. The intestinal absorbency, percent of 4-centimeter intestine, and percent intestine + cecum likewise did not relate to diet. Hence, my hypothesis was not supported because cecum presence and intestinal absorbancy did not relate to diet. Although previous studies have shown diet to have a greater impact on gut morphology, this study suggests that taxonomy had a larger effect on gut morphology than diet. However, this analysis was limited because the sample size was insufficient to make detailed comparisons of the independent contributions of taxonomic order and diet to cecum presence and absorbancy rate.

Erin Place

Faculty Sponsor: Dr. Jacqueline K. Augustine (Department of Evolution, Ecology, and Organismal Biology)

Variation in Organ Size Between Migratory and Non-Migratory Birds

Migration status has been observed to influence organ size. Previous studies have shown that compared to non-migratory birds, migratory birds have larger heart mass, pectoral muscle mass, gizzard mass, and intestine mass. The purpose of this study was to determine if migratory species had larger heart, pectoral muscle, gizzard, proventriculus:gizzard ratio, intestine, liver, and proventriculus size than non-migratory species. Thirty-one species of birds were salvaged, frozen, thawed and weighed. The heart, proventriculus, gizzard, pectoral muscle, liver, intestines, and cecum were dissected and weighed. We conducted a standard least squares regression test to determine whether organ size, calculated as percent of body mass, varied among long-distance migrants, short-distance migrants, and non-migratory birds. Taxonomic Family was a random effect in the analyses. Only the proventriculus:gizzard ratio varied with migration status, with non-migratory birds having lower values than migratory birds. Therefore, my hypothesis that organ size should be larger in migratory birds was not supported. My results are similar to other studies that found that the proventriculus:gizzard ratio is smaller in non-migratory species than migratory species. Differences between the current study and previous studies may be due to the number of species examined, the types of species examined, or the inclusion of additional covariates such as diet in previous studies.

Adnan Siddique

Faculty Sponsor: Dr. Jacqueline K. Augustine (Department of Evolution, Ecology, and Organismal Biology)

A Comparison of Bird Digestive Systems by Diet

The avian digestive system possesses unique organs and structures to accommodate a diversity of diets. In general, herbivores have longer, more complex digestive systems while carnivores have smaller,

less elaborate digestive systems, but most of the research in this area examines mammalian morphology. Accordingly, the goal of this study was to determine the influence of diet on digestive system morphology in birds. I expected the size of the intestines, cecum (if present), proventriculus, and gizzard would be larger in herbivorous birds and smaller in carnivorous birds. Birds of varying diets were dissected and their digestive systems (intestines, cecum, proventriculus, and gizzard) were weighed. Additionally, each organ's percent contribution to total body weight was calculated. Diet was determined by literature and by the stomach contents of each bird. A mixed model was used for comparisons with the percentage of body mass due to organ weight as the dependent variable, bird diet as a fixed effect, and family as a random effect. Results from 34 species revealed that diet affected size of the proventriculus but not the size of the intestines, gizzard, cecum, or the total digestive system. The proventriculus size was largest in insectivores and smallest in herbivores, with omnivores having an intermediately-sized proventriculus. Contrary to previous studies, our study did not support the hypothesis that herbivorous diets lead to a larger, more elaborate digestive system than carnivorous diets in birds. Because carnivores had to excluded from this study due to sample size, our ability to differentiate between taxonomical differences and trophic differences was hindered.

Hannah L. Downer

Faculty Sponsor: Dr. Ryan Norris (Department of Evolution, Ecology, and Organismal Biology)

Determining A New Evolutionary Divergence Date for Mus-Rattus

A set of fossils from Pakistan, particularly the 12 million year old Progonomys, have traditionally been interpreted as representing the point in time when laboratory mice (Mus) and lab rats (Rattus) last shared a common ancestor. This interpretation of their evolutionary history has been used extensively among biomedical researchers working with these model organisms. However, subsequent molecular results conflict with the evolutionary tree that forms the foundation for interpreting the fossil record. This in turn has now forced paleontologists to reevaluate the Siwalik fossils. With this new information, a new Mus–Rattus date needs to be determined for use by biomedical researchers. We analysed a four gene nuclear dataset within the family Muridae and incorporated information from fossils involving several locations

and evolutionary events. We conclude with recommendations to researchers looking to calibrate the Mus-Rattus divergence.

Adriana N. Jurich, Nelish Pradhan, C. William Kilpatrick

Faculty Sponsor: Dr. Ryan Norris (Department of Evolution, Ecology, and Organismal Biology)

Recovering the Evolutionary History of the Humped-nose Mice (Hybomys) and Relatives using the IRBP gene

The Hybomys Division, subfamily Murinae, includes three genera of mice found only in the African tropical forests. These are Stochomys (1 species of target rat), Dephomys (2 species of defua mice), and genus Hybomys (7 species of hump-nosed mice). Most researchers claim that Hybomys consists of two subgenera: Hybomys from Central African forests and Typomys from West Africa. In this experiment, we sequenced the IRBP gene from members of the Hybomys Division representing at least one species from each genus and from related members of Muridae. The DNA was used to build a phylogenetic tree that was used to evaluate the evolutionary divergence of the Hybomys Division. The results showed that Hybomys, Dephomys, and Stochomys were closely related. However, Typomys diverged from the other members of the Division much earlier in evolutionary history than the others. Biogeography supports our findings. Due to divides in the forest across West and Central Africa, the habitats of Hybomys and Typomys remain separated. We conclude that Typomys and Hybomys should be separated into separate genera, because they are not as closely related as originally thought.

Kathryn Wuebker

Faculty Sponsor: Dr. Doug Sutton-Ramspeck (English)

because he loves me

because he loves me, a twenty-page poetry chapbook completed for Doug Sutton-Ramspeck's Intermediate Poetry Writing (English 3466) in the fall of 2016, attempts to explore and analyze intersections between Catholicism and human interpersonal relationships. Together, the poems interrogate and challenge societal expectations and impressions of God, romance, faith, love, devotion, homosexuality, and sex. No gender is assigned to the speakers of the poems, which is meant to challenge our normal assumptions about gender roles and identities. These interrelations of faith and love attempt to forge a cohesive piece of work that asks its readers to contemplate their own interactions with spirituality and its parallels to their daily relationships. In addition, the work explores the hypocrisy of Catholicism and faith, relying on dark humor and strange, unconventional imagery to convey its messages.

Inspiration and research for this project came from various elements, including Bible scripture, attendance of Mass, and the author's personal experience of having been raised with a staunchly Catholic immediate and extended family. Examples of the duality of this chapbook and its inspirations can be found in poems such as "blow my house down," in which lines such as "We are everywhere now, even though this is not Your house – You just live in mine," create ambiguity. Readers are encouraged to think about the poem as representing love or faith (or perhaps both), given the capitalization of "You," as well as challenging whether this poem is talking about God or a lover, a common ambiguity that runs through almost the entirety of the work.

Ultimately, the author's primary intention is to upend normal societal reluctance to conflate and compare faith and sexuality and, consequently, to illuminate both.

David Braun

Faculty Sponsor: Dr. John R. Snyder (Health and Rehabilitation Sciences)

Actual Use Assessment of a Healthy Corner Store Intervention

More than 16,000 residents of Allen County live in food deserts resulting in difficulty purchasing fresh fruits and vegetables. Often, small retail convenience or corner stores serve food desert residents' need for groceries. These corner stores, however, rarely stock healthy food items including fresh fruits and vegetables. Activate Allen County, with funding from the Centers for Disease Control and Prevention, initiated an intervention "converting" select corner stores to be "healthy corner stores" by offering more healthy foods and fresh produce. The purpose of this study was to assess the actual use of the healthy corner

store intervention at three stores. Intercept surveys of customers, a sample of convenience, resulted in 164 completed surveys from a total of 570 customers. The majority of respondents shopped at the corner store once or more each week and lived within a one mile radius of the store. Results showed that while only 18.3% of shoppers had purchased healthy items during their corner store visit when they answered the survey, 27.4% reported that they were eating more fruits and vegetables because the store sells them. When asked about daily consumption of fruits and vegetables, an alarming 38% reported not eating any fruits yesterday and 44% reported not eating any vegetables.

Emily Rose Allen

Faculty Sponsor: Dr. Joseph Green (Psychology)

Exploring Expressive Writing to Reduce Test Anxiety on an Introductory Psychology Exam

Previous research suggests that a brief expressive writing exercise prior to a math exam can help alleviate anxiety and improve test-taking performance. Our study examined the effects of a short seven-minute expressive writing intervention among college students taking a mock introductory psychology exam. A total of N=93 students enrolled at The Ohio State University at Lima participated. Students first completed the Cognitive Test Anxiety Scale and a modified version of the Abbreviated Math Anxiety Rating Scale in order to establish how much anxiety they typically experienced during exams. We then randomly assigned participants to either write about their thoughts, feelings, and worries regarding an upcoming exam (experimental condition) or to write about factual content related to the course (e.g., names of theorists, how theories differed from one another, or facts learned in the course; control condition). Students then completed a 51-item mock exam covering content typical of an introductory psychology course. All students rated their anxiety level at multiple time points (i.e., before, during, and after the exam). We found that students in the expressive writing condition performed better on a mock exam, were more confident in their answers, and reported a greater reduction in anxiety after the writing exercise compared to the control condition. However, when we covaried out students' pre-study class grades, the between group effects on exam performance and confidence vanished. Impressively, given the brevity of the exercise, expressive writing continued to be associated with a greater reduction in self-reported anxiety.

Additional research is needed to more fully explain how expressive writing can be applied as an effective and efficient method of reducing test anxiety.

Katharine N. Black

Faculty Sponsor: Dr. Joseph Green (Psychology)

Meditation-Focused Attention, Hypnotic Susceptibility, and Problem Solving

The current study is part of an ongoing investigation of the Meditation Breath Attention Scores (MBAS) as a brief mindfulness measure of focused attention on breathing that could improve concentration and objective performance on solving anagrams. We previously found that a brief 15-minute exercise in mindfulness meditation resulted in improved performance solving anagrams, relative to a control condition where participants watched a video (Green & Black, in press). Additionally, participants that received an enhanced expectancy manipulation reported higher average estimates of solving anagrams; however, their actual performance did not improve. In this study, N=140 participants completed two sets of anagrams separated by the mindfulness meditation exercise. To permit an exploration of the role of expectancy on anagram performance, approximately half of our participants were explicitly told that the mindfulness exercise would result in improved performance on the second trial. We found that students solved more anagrams, relative to baseline, following the MBAS exercise. The positive effect of mindfulness training on anagram solving was not influenced by the expectancy manipulation suggesting that the effect is not due to experimental demands or alteration of beliefs about performance. This study adds to our previous work suggesting that brief mindfulness training may improve concentration and problem solving.

Olivia J. Green

Faculty Sponsor: Dr. Joseph Green (Psychology)

Exploring Links Between the HGSHS:A, Wessex Dissociation Scale, and the Dissociative Processes Scale

Previous investigators have reported small but positive correlations between several self-report scales measures of dissociative ability and hypnotic responsiveness (e.g., Green, Kvaal, Lynn, Mare, & Sandberg, 1991; Nadon, Hoyt, Register, & Kihlstrom, 1991; Woody, 1990). To our knowledge, however, researchers have not examined the Wessex Dissociation Scale (WDS; Kennedy et al., 2004) or the Dissociative Processes Scale (DPS; Harrison & Watson, 1992) with regard to predicting hypnotic performance. As part of an ongoing study examining associations between various measures of personality and hypnotic responsiveness, N=156 undergraduate students enrolled at The Ohio State University at Lima completed the WDS, DPS, and the Dissociative Experiences Scale-II (Carlson & Putnam, 1993), along with the Tellegen Absorption Scale (Tellegen & Atkinson, 1974), the Inventory of Childhood Memories and Imaginings (Wilson & Barber, 1981), and a brief 3-item measure of participants' expectancy to respond to suggestions before administration of the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A; Shor &Orne, 1962). As expected, the WDS and DPS correlated with other measures of dissociation, absorption, and imagination. Neither scale (nor any of the factor subscales of the DPS) correlated with hypnotic responsiveness. As we have found in previous work, students' expectancy toward hypnosis predicted actual performance on the hypnosis scale (Green & Lynn, 2011). We conducted a regression analysis and found that hypnotic responsiveness was predicted by expectancy, absorption scores, and scores on the detachment subscale of the DPS (factor 3). This finding suggests that the DPS factor of detachment is capturing some variance in hypnotizability unaccounted for by other commonly used scales.

2016 Undergraduate Research and Mentoring Committee

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Assistant Professor, Computer Science and Engineering

Joseph Green

Professor, Psychology

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Associate Professor, Education

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Associate Professor, History

Michael Reagon

Assistant Professor, Evolution, Ecology and Organismal Biology

John Snyder

Professor, Health and Rehabilitation Sciences

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Director of Student Life, Shane McCrory

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The Ohio State University at Lima, 4240 Campus Drive, Lima, Ohio, 45804

lima.osu.edu