2020

UNDERGRADUATE

RESEARCH FORUM

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 Spring Undergraduate Research Festival, 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.

2020 UNDERGRADUATE RESEARCH AND MENTORING COMMITTEE

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Associate Professor, Psychology

Joseph Green, *2020 Online Forum Organizer*
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The Ohio State University at Lima Undergraduate Research
Lima.OSU.edu/research/undergraduate-research/undergraduate-research-forum.html

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ABSTRACTS

Shivani Bhatt
Research Advisor: Dr. Ryan W. Norris

Systematics of Mountain Voles *(Alticola)* in Northern Pakistan

The mountain voles, genus *Alticola*, are a group of poorly understood high-elevation rodents. The world's three largest mountain ranges converge in Northern Pakistan which allow us to examine possible allopatric speciation in mountain voles. We extracted DNA from 90 individuals through northern Pakistan and sequenced the cytochrome b gene. We recovered 5 clades that seem distinct enough to represent different species. The clades correspond to the major mountain ranges such as the Great Himalaya, the Karakoram, and the Indu Kush, which is telling a biogeographical story. Our results conflict with morphological characteristics which are variable within species. We appear to have evidence for a new species in the eastern Kohistan arc mountains.

Victoria Bradford
Research Advisor: Dr. Joseph P. Green

Exploring the Use of Mandala on Anxiety

Previous work suggested that coloring a mandala results in greater reductions in self-reported anxiety than coloring a plaid design or "free coloring" (van der Vennet and Serice, 2012). With an undergraduate student sample (N=121), we examined whether coloring a mandala has a unique effect on reducing anxiety following a 4-minute writing exercise on a past anxiety-filled event. We compared coloring a mandala to tracing a mandala, free coloring, or simulating a waiting room (control condition). We collected anxiety readings at baseline, following the writing exercise, midway and at the end of our 20-minute intervention, and after a 15-minute delay. All interventions produced a reduction in anxiety; however, no one condition was superior to any other. Our findings do not support the claim that coloring a mandala is especially soothing or has unique anxiety-reducing properties. We also briefly assessed attitudes about coloring and how often students colored on a monthly basis.

Erica Franck
Research Advisor: Dr. Jacqueline Augustine

Prairie Biomass Maximized with Fall and Winter Prescribed Burns

Fires act as a major ecological force by helping to create a higher biodiversity of plant species in prairie ecosystems. Historically, prairie burns have occurred at all times of the year, but today prescribed prairie burns typically occur in spring. For this study, I wanted to investigate the effects of burn season on plant biomass of the prairie. I utilized a publicly available long-term data set available from Konza Prairie Long Term Ecological Research (LTER) Program located in the Flint Hills of Kansas. Data was obtained by clipping vegetation from eight watersheds, which included 2 replicate watersheds burned annually in spring, summer, fall, and winter. Each year, four upland and four lowland transects were established in each watershed. For each transect, vegetation clipped for five 50cm x 20cm quadrats, and sorted into forbs, grass, woody species, and previous year dead vegetation. Samples dried at 60C for 24-hr prior to weighing. Biomass was analyzed using an ANOVA with burn season, location, and interaction as fixed effects, and year and watershed as random effects. I determined that prairie burns done in the fall, winter, or spring produced large plant biomass, and summer burns produced the lowest plant biomass. Additionally, fall and winter burning decreased woody species biomass. Future work should examine the effects of grazing mammals on plant biomass. Cattle or bison grazing may affect overall plant biomass and diversity.

Covee Haney
Research Advisor: Dr. Patrick J. Carroll

Naïve Beliefs on Addiction

The present study tests the extent to which naïve theories of personality and addiction influence attitudes and intentions to seek or recommend treatment. Specifically, we employed a survey methodology to assess individual differences in the relative endorsement of disease versus choice addiction theories, fixed versus incremental personality theories, treatment attitudes and intentions. To be consistent with previous naïve theory research, we expected that those who showed greater endorsement of incremental over entity views of personality (e.g., intelligence, morality, willpower) would be more likely to endorse a choice over a disease model of addiction. Moreover, we predicted that greater endorsement of choice addiction theories and incremental personality theories would predict more favorable attitudes toward treatment and higher intentions to seek out or recommend treatment. Although the significant effect of these predictors did emerge, the direction was contrary to our hypotheses. Specifically, consistent with the attribution work, results showed that greater endorsement of incremental and choice addiction theories actually predicted *less* favorable attitudes and *lower* intentions to seek out or recommend treatment (e.g., 12-step program).

Sydney Hartford
Research Advisor: Dr. Meggie Young

Exploring the Use of Acting Methods by Undergraduate Theatre Majors

One principle aim of an actor is to realistically portray emotions to elicit reactions and empathy from audience members. Drama theorists and scholars – such as Konstantin Stanislavski, Lee Strasberg, Stella Adler, among others – developed their own processes for summoning emotions for character development. While studied globally, these methods vary greatly in terms of their approach to creating emotions. These techniques require actors to either derive emotional responses from themselves (i.e. Strasberg) or from contextual clues within the script (i.e. Stanislavski) (Kaplan, 2008). Because of this longstanding debate (Mullin, 1961), actors and scholars alike question the efficacy of these methods. An actor's ability to differentiate between their own emotions and their character's emotions, rather than the motivation and origin of the emotions themselves has been the primary focus of the research literature to date (Konijn et al, 2000). Although the processes of developing a range of emotions for characters is well-researched, understanding the origin of an actor's emotional development has been largely overlooked – especially in young, practicing actors (Orzechowicz, 2008). The purpose of this study was to investigate which methods of acting university-level practicing actors use in creating realistic emotions and explore whether actors engage in memory-based or artificially-stimulated emotions onstage. Undergraduate theatre majors (N=17 (men n = 10, women n = 7)) from 10 universities completed an online questionnaire about their training in acting as well as their experience with manifesting emotions in performance. The results showed that 88.2% of participants used emotional memory to portray a character and of those participants 86.7% found the technique to be effective. Only one participant showed interest in using emotional memory in daily rehearsals and performance. The results also showed that there was no significant relationship between an actor's training and the use of emotional memory. During an emotional scene, 58.82%

of participants expressed frequently experiencing the same emotions as their character. These results reveal that not only is an actor's training not indicative of their use of emotional memory, but that their characters' emotions are manifested based on individual preferences.

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Chassidy Oatman
Research Advisor: Dr. John R. Snyder

Population Health: Self-Reported Perceptions of Health Associated with Select Social Determinants

Population health is the overall health of people within a given geographic location measured by the distribution of health outcomes. Health outcomes such as morbidity and mortality are heavily influenced by genetics, behavior, physical, social, and economic pressures. Social determinants of health, the social, economic, and physical environmental conditions in which people are born, live, learn, work, and play, account for up to 50% of an individual's overall health status. Many people experience poor health due to inequities in social determinants even though many of these factors are modifiable. The first step to improving population health is to identify inequities in social determinants. This study posed the question of what social determinants of health are associated with Allen County adults' perceptions of fair or poor health. The study was conducted using secondary data from the 2017 Allen County Health Risk and Community Needs Assessment in which 17.7% of respondents (n = 99) self-reported their health to be fair or poor. For this subpopulation, cross-tabulation analysis was conducted with specific items pertaining to social determinants of health responses. Items were identified in each of the five domains of social determinants: economic stability, education, social and community context, health and healthcare, and neighborhood and built environment for further analyses. Results showed that among the adults who self-reported fair or poor health: (1) 61% spent more than 30% of household income for housing; (2) 41% reported at least one transportation issue; (3) 40% received their healthcare and medical advice at a hospital emergency room; (4) 39% were not totally confident in filling out medical records by themselves; (5) nearly a third (32%) of respondents reported at least one food insecurity within the past year; (6) 32% required assistance with health care; (7) 29% had an annual household income of less than $25,000; and (8) 24% had less than a high school education. Each of these findings represents an opportunity for reducing inequity and improving the health of adults in Allen County.

Camryn Weihrauch & Josh Sheppard
Research Advisor: Dr. Virginia Tompkins

Does college make you a better parent? It may depend on what classes you take.

The American Psychological Association (APA) recently suggested that physical discipline is an ineffective tool in child-rearing and may have harmful long-term effects. Recently, research has shown a link between parental education levels and the type of discipline used in raising their child. For example, greater physical discipline (e.g., spanking) is associated with lower parental education level. In our research, we examined the connection between parental education and spanking. There does not seem to be extensive research exploring why college education is related to views on spanking. The purpose of our study was to examine the differences in students before and after their college experience, hypothesizing that advances in cognition and specific courses taken may explain lower endorsement of spanking. Differences were analyzed in areas of cognitive style and beliefs about spanking; additionally, for seniors, we measured course-related experience with parenting. Participants were Ohio State freshman (n = 272) and seniors (n = 183) recruited through a Qualtrics survey sent to their school email. They were asked about their attitudes regarding spanking in general and age-delimited spanking. Additionally, there were scales ranking participants' Need for Cognition (e.g., preferring complex to simple problems) and Postformal Thought (e.g., problems may require different types of logic). Seniors reported significantly higher Need for Cognition and lower endorsement of spanking than freshmen. However, no significant differences were found on the Postformal Thought Scale. For seniors, we found that, controlling for the participant's ages, parent's average education level, and how frequently students were spanked as a child, the number of courses taken, but not the Need for Cognition Scale, predicted attitudes about spanking. Based on our findings, it is possible that specific coursework may predict spanking attitudes. This implies that students taking relevant coursework may benefit from coverage of parental discipline.

Jade Zeller
Research Advisor: Dr. Jacqueline Augustine

Comparison of Survival Rates between Males and Females of Northern Cardinals and Gray Catbirds

Sexual selection is one force that drives evolution. It is caused by one sex choosing to mate with individuals of the opposite sex that has favored traits, thus these favored traits are passed down through generations. Sexual selection results in color dimorphisms, usually colorful males and cryptic females. Many factors can affect survival between sexes resulting in the tendency for males to outnumber females within a population. Northern cardinals *(Cardinalis cardinalis)* are sexually dimorphic with males being a red color and female being mainly grayish tan, but gray catbirds *(Dumetella carolinensis)* are monomorphic with both sexes being dark gray. If sex and color affect survivability, then I predicted that males of both northern cardinals and gray catbirds would have higher survival than conspecific females. Furthermore, I predicted male gray catbirds would have the highest survivability. This study utilized a mark-recapture dataset of two bird species in Ohio State Lima Tecumseh Natural Area from 2010 to 2018. A robust design model was used in Program Mark that assessed the effect of sex, age class, time, and their interactions on survival estimates for each species. For cardinals, survival was higher after the initial capture as compared to subsequent recaptures, but there was no effect of sex. For catbirds, females had slightly higher survival than males; survival was also influenced by year and age class. Therefore, my hypothesis was not supported. Although there was model support for a sex difference in survival in gray catbirds, the difference may not be biologically important. Age class affects both species' survival. Most studies find that younger birds have lower survival rates, including my survival estimate of gray catbirds, but northern cardinals show the opposite trend. Both species' emigration rates varied by sex, thus future studies should seek to determine why male and female emigration rates vary.