

The Ohio State University at Lima

Undergraduate Research Forum

April 2, 2014

Library, 12:30



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 Rose for his support of this Forum. Thanks also to the support given by the Student Life.

ABSTRACTS

Zach Reneau

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

The Discourse of Dread

Though the movement of postmodern literature has traditionally resisted classification and definition, recent years have seen a solidification of its themes and techniques. *The Discourse of Dread* takes many of these features—primarily intertextuality, pastiche, and playful language—and explores their uses. Each piece in the collection exemplifies one of these techniques in particular, and plays with it; in doing this, the works seek to find new ways to tell a story. Through this play of mechanics, *The Discourse of Dread* questions common constructs of the short story, such as narrative and plot, and attempts to subvert them. In doing so, the collection invites the reader to reconsider his conception of what makes something a “story,” in hopes that he will realize that the answer is much broader than he once thought.

Sam Newport

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

Occupational Exposure

My 39 page short story, “Occupational Exposure,” focuses on the life of a mortician who deals simultaneously with his exacting career, a stunted emotional life, and a mother with dementia; these situations put the character into roles that alienate him from society. Written as a contemporary realistic piece, it presents Louis Carbine’s life in fragmentary moments over several years while blurring the timeline; it uses realistic detail to illustrate his struggle to merge his identities and issues, which he believes will offer him a respite, or keep the roles/problems separate, further alienating him from society. Rather than concentrating on a plotline, the story shows Louis’s life through his reactions to events and people to reveal his character and the conflicts in his external and internal worlds. The conventions that include the lack of a clear plot, short and disparate scenes, attention to realistic detail, and a focus on character are

characteristic of modern realistic literature in order to portray real life. The story ends on an ambiguous note about Louis's choice between the roles and a life in society, a technique often used by authors in order to depict the uncertainty present in reality.

Stephani Fuson

Faculty Sponsor: Dr. Fabio Leite (Psychology)

The Effects of Dual-Color Highlighting on Reading Comprehension

One way to make connections among portions of new material is by color coding related material. In a color-coding study, it was shown that making meaningful connections and directing attention can enhance memory and comprehension. Further research had found better performance in a testing condition when the information being tested was highlighted. Thus, it is possible that highlighting relevant information that falls under one main idea in one color, and then using another color to highlight relevant information that relates to a separate idea could enhance comprehension of the material. The current study has been designed to test this idea. This design uses highlighting condition as the independent variable, with two levels (Dual-color highlighting and single-color highlighting). The design is within subjects for the change in performance between the single highlight condition and the dual highlight condition of every participant. The dependent variable is the amount of improvement on test scores from the single highlight condition to the dual highlight condition. Controls have been put in place to minimize order effects for both, the article received first and which of the highlight conditions they will perform first. Preliminary data (from a small sample of 80 participants, which is far short of the 210 participants that were estimated to be necessary to measure the effect, if present) has been collected and analyzed. This preliminary data analysis shows no superior performance for dual-color highlighting when compared to single-color highlighting, but also points to the possibility that dual-color highlighting will only be superior to single-color highlighting after training, and could perhaps be related to the difficulty of the material being read. Whereas further data collection is ongoing, a future follow-up involving training is also being considered.

Richard J. Smith, Stephani Fuson, and Katharine Black

Faculty Sponsor: Dr. Fabio Leite (Psychology)

A Direct-Replication Study Exploring an Often-Cited Memory Effect

Schooler and Engstler-Schooler (1990) challenged conventional beliefs by demonstrating how certain kinds of processing affect memory performance. Because data collection for a follow-up study is ongoing, we will limit ourselves to saying that their finding is both theoretically important and surprising, as shown by their study having been cited more than five hundred times in subsequent research and in standard textbooks in psychology. Over the years, however, Schooler's attempts to reproduce that finding have been met with measured effect sizes substantially smaller than those of the original study. Moreover, few other laboratories have attempted direct replications of the crucial first study. Given the uncertainty about the size of the effect, direct replication of the original study by multiple laboratories was planned to help determine the robustness of the interfering effects of processing on human memory performance. Because the results of the study may not be presented yet, we report our experience in being part of one of the 29 laboratories (across 10 countries!) to direct-replicate Schooler and Engstler-Schooler's (1990) original study. We will also discuss the importance of direct replications by explaining the different types of replication studies and their significance to psychological science.

Richard J. Smith

Faculty Sponsor: Dr. Fabio Leite (Psychology)

Sex, Fear & Disgust: Attentional Biases Toward Emotional Words

Emotionally arousing stimuli have been shown to capture human attention more than neutral stimuli in several research paradigms. For example, previous research in recognition memory tasks, in which participants were presented mixed lists of neutral and negative emotional words, then instructed to decide if words presented in a second list appeared in the first, showed participants reacted more quickly to negative words than neutral words. Similarly, research exploring the attentional blink, a task in which participants select a target image from a series of neutral and emotionally valenced images presented in timed succession, has shown emotional stimuli interfere with the ability to select target images. Further, past research exploring the attentional blink phenomenon isolated arousing stimuli into erotic, fear, and disgust-evoking conditions, and showed greater attentional biases toward sexual stimuli in rapid serial

visual presentation (RSVP) tasks. The current study compiled a unique list of emotional words designed to distinguish between fear and disgust categories in a way not done in previous research explicitly. The goal of this study was to compare attentional biases of sexual, fear, and disgust-evoking stimuli by measuring response times among word-category conditions in recognition memory and lexical decision tasks. Preliminary results show significant main effects among emotional categories in all conditions but for true words in the lexical decision task, likely driven only by sexual/erotic words.

Daniel Blosser and Kaylin Duffy

Advisor: Dr. Virginia Tompkins (Psychology)

How Parenting Style and Economic Status Contribute to False Belief Understanding in Children

An important achievement in social cognition is false belief understanding. False belief understanding develops in children around the age of four to five and refers to the understanding that people can have beliefs that differ from reality or other people. The majority of research on false belief understanding has been conducted with middle-class preschoolers. However, some studies with low-income children indicate that they may be slower to develop false belief understanding, although few researchers have explored explanations for this finding. In the current study, I propose that parenting styles may be one such explanation for different rates of false belief understanding between low- and middle-income children. Prior research has established a link between parenting styles and false belief understanding in preschoolers. Such studies show that children, who are subject to more punitive parenting styles, perform lower on measurements of false belief than children whose parents offer more explanation as to why a behavior is undesirable. Prior research also shows that low-income parents tend to be more punitive in their parenting style. It can thus be hypothesized that social class differences in children's false belief understanding may be explained by differences in parenting style.

Participants consisted of one hundred and eighty seven low- to middle-income children aged three to five and their parents. The children were given a test of false belief understanding. Additionally, the parents of the children were given a parent questionnaire to measure parenting style. Data collection is complete and data is currently being analyzed. Data on false belief understanding and how it relates to parenting styles carries practical implications in today's world. If parents could be made aware that certain

parenting styles enhance the false belief understanding in their children, then that aspect of cognitive development may be achieved sooner.

Katharine Black

Faculty Sponsor: Dr. Joseph P. Green (Psychology)

Focused Breathing and Word Solving Performance

Frewen (2008; 2011) developed the MBAS as a test of mindfulness. Participants complete the MBAS with their eyes closed meditating on their breathing. During the test, subjects report if they are concentrating on their breathing periodically when a chime is sounded. Last year, we administered the MBAS to 90 OSU Lima students and tested their ability to solve anagram word puzzles under quiet and distracting conditions. In our repeated measure design, we found some evidence for improved performance following MBAS training. However, there were some problems equating the difficulty of the word lists and our results could be explained by a practice effect. In the present study, we built upon and modified our earlier design. We presented each of our 15 anagrams sequentially, via computer, for 10 seconds (previously, we presented anagrams together as a group); we also intensified our distraction condition by framing words by a video with lights randomly appearing in the margin of the screen. We used a repeated measures design where students completed two sets of anagrams under quiet and distracting conditions. In the current study, we have tested 199 participants. Opposite our prediction, there was no trial by group interaction and distraction trial scores were higher among our video than our MBAS group. Across both groups, scores increased during the distraction trial, $p < .001$, suggesting that the distraction either did not work or that a practice effect overpowered the distraction condition. Subjective reports about how well subjects thought they performed on the second anagram trial and how distracted they felt did not differ between groups. We examined whether MBAS scores correlated with any of the five FFMQ subscales and found significant correlations with Describe and Non-react. Females tended to solve more anagrams than males across both trials.

Richard J. Smith

Faculty Sponsor: Dr. Joseph P. Green (Psychology)

Does the Time of Assessment Affect Hypnotizability, Absorption, and Fantasy-Proneness Scores?

Previous research has found hypnotizability to vary based on the time of day in which the session was conducted (Aldrich & Bernstein, 1987). In the current study, with a sample of nearly 700 subjects, we found data to support Wallace's (1993) finding that hypnotic responsiveness, measured by participants' scores Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A), was higher in the mid-morning hours compared to other times of day. Self-reported time of day preference (e.g., morning, afternoon, or night preference to study, work, read) did not relate to hypnotizability scores. We also administered a series of self-report questionnaires prior to hypnosis sessions, measuring a variety of personality traits. Our findings suggest that higher scores on questionnaires measuring for levels of performance expectancy, fantasy-proneness, and alexithymia correlate with higher scores on the HGSHS:A. Finally, a regression analysis showed that measures of expectancy, interest in being hypnotized, and absorption predicted hypnotic performance.

Justin D. Hammer

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

Fresh fruit and vegetable consumption by adults residing in food deserts and non-food deserts in Allen County, Ohio

A food desert can be defined as an area that lacks access to affordable and nutritious foods (3). These locations tend to be low-income communities (3) and are often populated by racial and ethnic minorities (2, 5). This lack of access can have adverse effects on food desert residents' diets, especially their intake of fresh fruits and vegetables (4). Individuals who do not consume the recommended servings of these foods are more likely to suffer from a variety of chronic diseases, including heart disease, diabetes, and cancer (1). In this study, a health survey was constructed by Activate Allen County and distributed to 796 Allen County adults ranging from 18-75 years of age with the purpose of evaluating the eating habits of both food desert and non-food desert residents. These individuals were categorized as either living in a food desert or not using zip code demographics. Of the 796 surveys distributed, 333 were completed (or

partially completed) and returned for a 42% response rate. Returns were analyzed using the Statistical Package for the Social Sciences to generate descriptive statistics. Results showed an overall low consumption of fruits and vegetables among the respondents, with no significant difference between food desert and non-food desert residents. The surveys returned indicated that fruit and vegetable variety, price, quality, taste, and preparation time were not significant factors influencing consumption. A possible explanation for this unexpected data is that the demographics of the returned surveys were not similar to the Allen County population with a disproportionate number of returns from older and more affluent respondents. Additionally, it may be that the eating habits of the Allen County adults do not regularly include the recommended number of servings of fresh fruits and vegetables, despite perceived access and affordability. Another feasible explanation is that access to transportation was not a variable in the health survey. Follow-up studies could focus on the impact transportation has on the diets of both food desert and non-food desert residents.

Steven Robison

Faculty Sponsor: Dr. Tony Shoup (Engineering)

LED Matrix

The LED Matrix is an array of light emitting diodes (LED) that will render three dimensional designs in light. The design enables the viewer to view the model in all directions without any obstruction. It also gives visual effects that can be useful for props, shows, arts and crafts, or even just for fun. The LED Matrix is much different than a 3D Television. The LED Matrix does not render artificial 3D designs and does not require 3D glasses to enjoy watching 3D illusions.

The LED Matrix is designed using a total of 729 LED's and are wired together into a programmable microcontroller. Each LED can light up one at a time using only 28 digital I/O pins. The structure of the electrical wiring uses a method called Charlieplexing. The programming language used is C++ and is developed in Arduino's IDE interface. Arduino is an open source platform and purchasing an Arduino board is inexpensive.

The next version in designing an LED Matrix is to build a bigger scale model and introduce multi-colored LED's. The model will be controlled by multiple microcontrollers to control the colors, patterns, and three dimensional shapes. A GUI (Graphical User Interface) will also be developed for hobbyist, visual art designers, and animators so they can build their own designs. Most of the programming would be done

to control the LED's during the build process. The user would have the ease of access to color schemes, swatches, patterns, layers, and the 3D simulated model of the cube. They can do their own form of programming by use of a video timeline or a light mixing board. Animators can use the LED Matrix to animate cartoon objects or entertainment. There will be many other ideas to add to the next LED Matrix build.

Ryan Kinn

Faculty Sponsor: Dr. Jacqueline K. Augustine (Biology)

**Response to Chemical Cues From A Predator In A Cavity-Nesting Bird Species,
The House Wren (*Troglodytes aedon*)**

It has been generally accepted that birds have a poor sense of smell; however, recent studies have shown differential behavioral reactions to various scents in songbirds. In particular, birds may use olfaction for early detection and avoidance of nearby predators. Predator detection via olfaction may be particularly important in cavity nesters because predators could trap them or ambush them from within the cavity. We examined the response of House Wrens (*Troglodytes aedon*), a common, cavity-nesting songbird, to different odors. We hypothesized that the wrens would show anti-predatory behaviors when exposed to a predator odor. To test this, we placed filter papers treated with urine from the American mink (*Neovision vision*); a pureed solution of Garlic Mustard (*Alliaria petiolata*), an odiferous control; or water in the nest box during both the incubation and feeding stage. We video-recorded the response of the wrens and quantified changes in time to enter the box or time spent in the nest box. Our data showed no significant differences in the reaction of wrens during the incubation stage; during the feed stage however, there was an increase in the longest time spent in the box in order from the garlic scent, the mink scent, to the water control. Our results indicate that although wrens may not use olfaction to avoid predators, they do modify their behavior in the presence of certain smells.

Megan Ahrns

Faculty Sponsor: Dr. Jacqueline K. Augustine (Biology)

Effectiveness of Predator Guards on Nest Boxes for House Wrens (*Troglodytes aedon*)

Predation limits reproduction and survival in many animals. Some bird species protect their eggs by laying them in cavities, preventing the predators from accessing the nest. Nesting boxes are often used to increase the nesting opportunities of cavity-nesting birds, but they are susceptible to predators. I tested the effectiveness of three types of predator guards relative to a control (no predator guard): “extension” of the entrance to prevent predators from reaching into the nest box, “tube” which prevents predators from getting a grip on the pole, and a “funnel” which predators cannot proceed past. I predicted that the funnel guard would increase the nest success of the House Wrens the most because it would prevent a diverse array of predators from climbing the nest box pole. Additionally, I expected the wrens would nest equally in all the boxes. Thirty nest boxes of each type (control, extension, tube, and funnel) were distributed equally among a wooded area, a golf course, and a park (120 nest boxes total). House wrens attempted nests in all predator guard types equally. The tube predator guard had the greatest proportion of nests that successfully fledged at least one offspring; whereas, wrens nesting in control boxes were the least successful. An unexpected finding was that some predators accessed nest contents by removing the lids and that this occurred most often in the boxes with the entrance extension. My first prediction was not supported, the tube was the most successful, not the funnel. My second prediction was supported because the wrens nested equally in all the boxes. In the future, the box lids should be more secure so they cannot be removed. Additionally, future research should determine whether greasing the tube decreases predation further. This study demonstrates that predator guards are effective in reducing predation of nests.

2013 Undergraduate Research and Mentoring Committee

Nicoleta Roman, Chair

Assistant Professor, Computer Science and Engineering

Jacqueline Augustine

Assistant Professor, Biology

Joseph Green

Professor, Psychology

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Young Ah Lee

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Director of Student Life, Shane McCrory

The Ohio State University at Lima: Undergraduate Research

lima.osu.edu/students/research

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

lima.osu.edu

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