

Lafayette College Presents
the 9th Annual
Lehigh Valley
Society for Neuroscience Chapter

and
the 33rd Annual
Lehigh Valley Association of
Independent Colleges

UNDERGRADUATE
PSYCHOLOGY AND
NEUROSCIENCE
RESEARCH
CONFERENCE

Saturday, April 21, 2018



LAFAYETTE
COLLEGE



2018
Lafayette College
Lehigh Valley Association of
Independent Colleges (LVAIC)
And Lehigh Valley Society for Neuroscience
(LVSfN)
Undergraduate Conference

LVAIC Member Institutions

Cedar Crest College
DeSales University
Lafayette College
Lehigh University
Moravian College
Muhlenberg College

Participating Colleges and Universities

Cedar Crest College
DeSales University
Dickinson College
Eastern University
Lafayette College
Lehigh University
Lycoming College
Moravian College
Muhlenberg College
St. Francis University
Ursinus College



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Conference Schedule:

8:00am-9:00am:	Registration and Continental Breakfast
8:45am-9:45am:	Morning Paper Session I <u>Session 1.</u> Social Psychology (224 Oechsle) <u>Session 2.</u> Cognitive Psychology (223 Oechsle)
9:50am-10:50am:	Morning Paper Session II <u>Session 1.</u> Developmental-Educational And Clinical Psychology (224 Oechsle) <u>Session 2.</u> Social & Cognitive Psychology (223 Oechsle)
11:00am-12pm:	Poster Session (Marlo Room, Farinon)
12pm-1pm:	Lunch (Upper Farinon)
1:10pm-1:15pm:	Welcome: Abu Rivzi Provost, Lafayette College (224 Oechsle)
1:15pm-2:15pm:	LVAIC Keynote Address (224 Oechsle) Kathy Hirsh-Pasek, PhD Temple University
2:30pm-3:30pm:	Afternoon Paper Sessions <u>Session 1.</u> Neuroscience (224 Oechsle) <u>Session 2.</u> Social Psychology (224 Oechsle)
3:45pm-4:30pm:	LVSfN Keynote Address (224 Oechsle) Ashley Juavinett, PhD Cold Spring Harbor Laboratories

Keynote Speaker: Kathy Hirsh-Pasek, Temple University

“A prescription for play: Why play fosters social and cognitive development”

Yale Professor Ed Zeigler wrote that “play is under siege.” In 1981 40% of a child’s discretionary time was spent in play. By 1997 that time had already decreased to 25%. In the last two decades children have lost 8 hours of free



play per week and thousands of schools in the United States have eliminated recess to make time for more academic study (Elkind, 2008). Ironically, our children have not profited from this extra “educational” time, nor from the so-called educational toys. Recent international tests of 14-year olds suggest that we rank 17th among industrialized nations in reading behind Poland and Japan. We rank 30th in math, 13 slots behind Estonia. This talk evaluates the evidence for the importance of free play and guided play as a catalyst for learning. Using science as a base, I argue that play might offer an important context for growing child’s academic, social and physical well-being. We also explore why play and particularly guided play might offer a successful midway position between the warring factions of playful

and didactic approaches to early childhood education. Play and learning are not incompatible. It is possible to have strong curricular goals that are presented to children within a playful pedagogy.

LVSfN Speaker: Ashley Juavinett, Cold Spring Harbor Laboratories

“What tiny mouse brains can tell us about visual perception”

Each moment, our brain integrates sights and sounds to help us make decisions and move through the world. We’ve learned a tremendous amount about this process from human psychophysics and fMRI, but we’d like to understand the neural building blocks. What are the cell types and circuits that enable us to perceive the world, and how do they get their job done? Using the mouse visual cortex as a model, I’ll demonstrate the ways in which we can learn about visual perception through the eyes of a small rodent.



Morning Paper Session I: 8:45am-9:45am
Social Psychology
Oechsle 224

How Modern Technology Affects Social Interactions Between Close Friends
9:00-9:15am

Anna Petrik, Sunny Greenberg, Morgan D'Antonio, Brittany Slaven, & Abria Jackson,
DeSales University
Faculty Sponsor: Dr. Sarah Starling

Technology is an increasingly relevant topic of interest in modern society. As advanced technology surfaces, new implications for society consequently follow. These consequences include changes in how our social interactions are structured. Today, many people tend to prefer texting or messaging using a mobile device rather than a face-to-face interaction to communicate with friends and family. This undoubtedly has implications on our society as a whole, as humans have natural tendencies for social interactions. In the present study, we explored this topic further. Same-sex friend pairs came to our observation room and played a game of Jenga. During their interaction, we observed their behaviors such as phone use, eye contact, and conversation habits. The participants engaged in two rounds of Jenga. The first round they were allowed to freely use their phones. However, during the second round, we specifically asked them to not use their phones. After both rounds, we asked the participants to separately complete questionnaires about both the strength of their friendship and their opinions about the interactions during the games. We hypothesized that there would be a negative correlation between cell phone use and quality of interaction. We expect that if a friend pair uses their mobile devices frequently, their social interaction will be of a noticeably lower quality. Inversely, we hypothesize that if a friend pair withstands from using their phones, either naturally or after being asked not to, they will engage in a higher quality interaction.

University Students' Residential Preferences and Intergroup Interactions
8:45-9:00am

Jiadi Cai, Lehigh University
Faculty Sponsor: Dr. Christopher Burke

The college environment exposes many students to a higher level of diversity than they have previously encountered. While there are potential benefits of working in diverse environments, such environments also pose potential challenges, particularly for members of smaller subgroups, such as international students or students of color. Students may choose to selectively associate with ingroup members in order to ease some of these challenges, and one way that they may do so is by expressing a preference for living with ingroup members while attending college. This study compares the daily experiences and residential preferences of students living with roommates from the in- and out-groups on college campuses. All participants completed a background survey asking about demographic characteristics, past and present house-mate characteristics, and roommate preferences. A subset of students also completed a 14-day daily diary study, reflecting on their daily experiences, such as stress, micro-aggressions, perceived belonging, and prosocial interactions. Data analysis focuses on whether students from smaller subgroups are more likely to show a preference for living with ingroup members, and whether cohabiting with ingroup members can help to buffer students' daily experiences. With the aim to assess the impact of residential arrangements on students' intergroup relations, this study will provide insight into how students' housing arrangements may

affect their daily experiences, future residential preferences, as well as intergroup relationships at diverse academic institutions in the United States.

Effect of Status and Power on Altruism, Self-Esteem, and Belief in a Just World

9:15-9:30am

Ravneet Sandhu, Cedar Crest College

Faculty Sponsor: Dr. Kerrie Baker

The behavior of individuals with varying degrees of status and power has been of interest to psychologists. In the current study, status and power were manipulated to be either in the high condition or low condition in a board game. Seventy-one Cedar Crest students participated in the study for extra credit. Participants were randomly assigned to the following roles in a board game: King (high power/high status), Tax Collector (high power/low status), Bishop (low power/high status) and Merchant (low power/low status). Self-esteem was measured before and after the game. Belief in a just world and altruism were measured after the game. It was predicted that: having high power or high status will increase self-esteem, and people with high status or high power will show a greater belief in a just world. Further, it was expected that high-power individuals will show less altruism, while high-status individuals will demonstrate high altruism. An ANOVA conducted for status and power on self-esteem before and after the game showed no significant main or interaction effects. A two-way ANOVA for power and status on belief in a just world did not show significant main or interaction effects. A two-way ANOVA for power and status with altruism did not show significant main or interaction effects. Results showed that participants with higher self-esteem were more likely to believe in a just world. Interestingly, older participants were more likely to be altruistic and have higher self-esteem. The findings expand our understanding of board-game behavior and demonstrate that short-term advantages may not affect behaviors associated with higher prestige and power.

The Effect of Essential Oils on Stress in College-Aged Students

9:30-9:45am

Julia Baldassano, Jessica Lomorticello, Sarah Lynch, Priya Pathak, & Kaelee Rupell, Desales University

Faculty Sponsor: Dr. Sarah Starling

It has been claimed among retailers that the use of essential oils has a positive effect on emotions and cognition. An essential oil is an oil taken directly from the plant whereas fragrance oils are man-made oils that replicate the smell of an essential oil, but do not contain actual oil from the plant. The goal of the current study is to explore whether or not essential oils actually have an effect on stress, or if the scent in general is what is beneficial. We used bergamot oil because its light citrusy scent is often marketed for stress relief. College age participants wore a bracelet with a lava rock, a naturally porous rock that absorbs liquid, for a five-day period. The bead contained an essential oil, a fragrance oil (as a scent matched comparison), or water (the control group). Each participant's stress levels were measured both before and after the five-day period. Our hypothesis was that both the essential oil and fragrance groups would show a reduction of stress levels but that the control group, who only had water on their bracelet, would not see a change in stress reduction. The fragrance group might see a decrease in stress levels as a result of having the scent of bergamot, even though it isn't the essential oil. Finding whether essential or fragrance oils lower stress for college age students could provide an easy method for relieving stress.

Morning Paper Session I: 8:45am-9:45am
Cognitive Psychology
Oechsle 223

The Influence of Locus of Control and Task Difficulty on State Anxiety

8:45-9:00am

Savannah Tobias, Cedar Crest College

Faculty Sponsor: Dr. Kerrie Baker

The psychology literature suggests that overtime, individuals acquire an external or internal locus of control, which can either help or hinder problem-solving abilities. However, few studies have examined internal and external locus of control and its effect on state anxiety. The present experimental study gave 93 participants 2 minutes to complete a task to determine if state anxiety would increase. The task included an anagram puzzle, which served as the difficult condition and alphabetizing words served as the easy condition. The Internal-External Locus of Control Scale (Rotter, 1966) was given to participants to identify as external or internal locus of control. The State-Trait Anxiety Inventory (Spielberger, 1983) was given to participants both before and after the task as an assessment for comparing state anxiety scores. Specifically, it was predicted that participants with an external locus of control would demonstrate higher levels of state anxiety than those with an internal locus of control in the difficult task condition. A mixed design ANOVA indicated that state anxiety increased from time one to time two, regardless of whether the easy or difficult task was given. It was also noted that more participants had an external locus of control than an internal locus of control, but locus of control had no statistically significant effect on state anxiety. The findings expand awareness of perceived control, as it appears that the extent of difficulty in a situation is not more important than an individual's locus of control. Regardless of an easy or difficult task, the 2-minute time limit made some participants appear more uncomfortable and concerned, conceivably because perceived control was decreased. However, research can be expanded to further examine locus of control and state anxiety.

Extensive versus Limited Medication Choice and its Influence on Medication Compliance

9:00-9:15am

Stacy Denbaum, Lehigh University

Faculty Sponsor: Dr. Jessecae Marsh

The choices individuals must make on a day-to-day basis can often be overwhelming. The choice overload hypothesis suggests that a wide range of choice options can at first be desirable. It is when one has to make a selection among multiple options with limited variability between the choice set, that making a decision becomes demotivating and leads to feelings of distress. My research examines how the number of medication options presented, either a limited or extensive amount, can affect satisfaction and compliance in patients who are taking medications. Amazon Mechanical Turk participants will be presented with a limited or extensive medication and fertilizer option sets. They will then answer a series of questions related to the medication and fertilizer that is ultimately selected. It is hypothesized that those given a limited choice set will be more satisfied with their medication and fertilizer, which will make them more likely to continue taking the medication properly and using the fertilizer properly. This effect will be larger in medication decisions than non-health decisions. Additionally, those who have the medications picked for them by a physician will be more satisfied with the medication selected

and will show less of an overall effect of choice set size. With a greater understanding of the factors that affect medication compliance we can improve overall public health and economic outcomes.

How Specific Colors Can Affect Short-Term Memory

9:15-9:30am

Rhianna Delich, Teresa Nascone, & Maria Pawlowski, DeSales University
Faculty Sponsor: Dr. Sarah Starling

Students use a variety of techniques to help them retain information when preparing for exams. Color coding and highlighting are common studying methods; however, it would be beneficial to know whether all colors are equally helpful to use for retaining information. It has been demonstrated that not all colors can be remembered equally as well (Bynum, Epps, & Kaya 2006); therefore, it is possible that information presented in some colors will not be remembered as well as other colors. The present study examined which specific colors best benefit short term recall of information. Participants were college students without visual impairments that would influence their color vision. The effects of the different colors were determined by testing the participants with different color-coded material. Short PowerPoint presentations with material on varying subjects were shown to the participants to study, and the most important material was pre-color coded. Each of the four different PowerPoints used a different color to code the information: red, pink, orange or blue. After studying each PowerPoint, the participants completed a short quiz that determined how much information they were able to recall correctly. We hypothesized that the colors will not be equally as helpful, and orange will stand out as the most beneficial for memory recall. We believe this because in a previous study, orange was found to be an easier color to remember compared to the other colors it was tested against (Bynum, Epps, & Kaya, 2006).

Competition in Task Switching

9:30-9:45am

Larissa Veres, Chad Petipren, Khalid Horne, & Jennifer Kelso, DeSales University
Faculty Sponsor: Dr. Sarah Starling

Task switching (or multitasking) involves engaging in two tasks at the same time. Recent research that has explored task switching has shown that when task switching, responses generally take longer in comparison to task repetition (repeating the same task multiple times). Many variables can influence performance such as reward, which has shown to have a positive impact on error rates and reaction times. The aim of this study was to test competition as a manipulative variable in task switching. Participants switched between two sets of two tasks, (completing a written maze and verbally answering spelling questions, completing a written word search and verbally answering simple math questions) and were observed for time and accuracy. Participants were told for the second set of tasks that they are competing with other participants for a small prize. We hypothesized that once competition is involved task switching speed and error rate will increase in comparison to the non-competitive set of tasks. This is because when competition is added, we theorize that participants will increase their speed with the intentions of getting more mazes and verbal problems completed, but they will sacrifice their accuracy in doing this.

Morning Paper Session II: 10:00am-11:00am
Developmental-Educational and Clinical Psychology
Oechsle 224

The Effects of Positive Affect on Grit in an Unsolvable Task

9:50-10:05am

Kirin Uzar, Cedar Crest College

Faculty Sponsor: Dr. Kerrie Baker

Grit has been found to be an important indicator of future success. However, proponents of grit have not yet been fully identified. The effect of an induced positive mood on subjective and objective measures of grit were assessed in 87 students from Cedar Crest College. Participants completed the Grit-S measure before the experimental group was handed a bag of candy to induce a positive mood. Participants then completed a task on the computer that measured grit objectively by the number of attempts and time spent on an unsolvable puzzle. Afterwards, participants took the Grit-S measure a second time. The researchers expected the experimental group to show an increase in grit as measured by the Grit-S scale from Time 1 to Time 2, and higher scores on the objective measure of grit as well. That is, participants with an induced positive affect were expected to make more attempts and spend more time on the unsolvable task than the control group, indicating higher levels of grit. Participants were categorized based on self-reported mood, and their data was analyzed accordingly. The results of an ANOVA indicate that there was a significant main effect for mood. This effect suggests that regardless of time, the more positive mood group scored significantly better on the Grit-S than the less positive mood group. Additional analyses indicate that there is a significant positive correlation between self-reported mood and time spent on the unsolvable graph. Taken together, positive affect maintains grit in an unsolvable task.

Fiction or Nonfiction? The Effect of Genre on Verbal Ability and Reading Comprehension

10:05am-10:20am

Callie Rose Teufert, Lehigh University

Faculty Sponsor: Dr. Ageliki Nicolopoulou

In recent years, there has been an eagerness among educators to include expository nonfiction texts earlier and earlier in the curriculum. With the limited time dedicated to reading in schools, fictional texts often lose out. However, it has been argued that success in reading fictional texts may provide a strong background for understanding expository texts. In fact, research has shown that recognition of fictional texts as compared to expository texts better predicts reading comprehension among college students. This has not been confirmed with early adolescents, since the results from three studies were mixed. The current study reexamines this question with 6th, 7th, and 8th graders using Authors and Titles Recognition Lists for both fictional and expository texts to see whether they predict students' language abilities (Achieve3000) and reading comprehension skills (Core Academic Language Skills Instrument). Preliminary results indicate that recognition of fictional authors and texts better predict language abilities and reading comprehension than recognition of expository nonfiction texts.

The Effect of Maternal Sensitivity and Maternal Warmth on Prosocial Behavior in Toddlers

10:20-10:35am

Emily Sauer, Lehigh University
Faculty Sponsor: Dr. Deborah Laible

Prosocial behavior is one aspect of morality and an important component of positive human interaction. In order to understand more about moral actions and why some people are more inclined to behave prosocially, it is imperative to understand factors that contribute to individual differences in prosocial behavior. Previous research has emphasized the influence of positive parent-child interactions and parental support on children's morality and prosocial tendencies. The current study focuses on the potential effect of maternal sensitivity and maternal warmth on prosocial behavior in toddlers. This investigation will analyze levels of maternal sensitivity and maternal warmth during a 10-minute free-play session taped from a previous study at Lehigh University with mothers and toddlers. The study will also explore relations between maternal sensitivity and maternal warmth and action tendencies of toddlers in numerous instrumental helping, sharing, and empathy tasks. Two hypotheses were made in this investigation. The first is that toddlers who have mothers with higher scores of maternal sensitivity and higher scores of maternal warmth will be more likely to help, share, and empathize with an experimenter. The second hypothesis is that toddlers who have mothers with higher scores of maternal sensitivity and maternal warmth will respond to the experimenter's needs more quickly than children with mothers of lower sensitivity and lower warmth.

Maternal Personality and Adolescent Conversation Involvement

10:35-10:50am

Rachel Abramowitz, Lehigh University
Faculty Sponsor: Dr. Deborah Laible

Parent-child relationship quality is largely dependent on both the parent and child's contributions, including the parent's personality (Kochanska et al. 2004). Adolescents who reported higher quality parent-child relationships also communicated more, felt more comfortable disclosing information, and appeared more involved during conversations with their parents (Ackard et al. 2006; Kerr & Stattin, 2000). Greater communication, involvement and disclosure has occurred when adolescents view their parents as trustworthy, accepting and supportive (Guilamo-Ramos et al., 2006), which have correlated with Big Five Personality measurements of agreeableness, openness and emotional stability (Dinesen, Nørgaard, & Klemmensen, 2014; Metsäpelto & Pulkkinen, 2003). To measure conversational involvement, research has focused on nonverbal cues during conversations (i.e., body orientation, postural openness and kinesic attentiveness cues) (Burgoon & Le Poire, 1999; Coker & Burgoon, 1987). The present study examines the relationship between maternal personality traits and adolescent involvement in conversations via their nonverbal behaviors. One-hundred mothers and adolescents participated in an adolescent-led, emotional disclosure conversation. Results revealed adolescents appeared more nervous during conversation with extraverted mothers. These findings provide insight on parent personalities that influence adolescent's involvement and disclosure during conversations. Adolescent disclosure with parents has been linked to overall life satisfaction and fewer maladaptive behaviors (Levin, Dallago & Currie, 2012) and can be implemented in interventions for parents in an effort to protect their children from engaging in risky behaviors, by providing a supportive environment for adolescents to talk about their feelings and concerns.

Morning Paper Session II: 10:00am-11:00am
Social Psychology
Oechsle 223

Perceived Effects of Pairing Alcohol Messages with Maternal Disclosure of Underage Drinking

9:50-10:05am

Astrid Phillipson, Lehigh University
Faculty Sponsor: Dr. Lucy Napper

Past research has shown mother' disclosure of their own underage drinking is associated with negative outcomes; however, there is a lack of research testing whether there are contexts in which maternal disclosure has benefits. There is a need for research to examine whether pairing disclosure with other alcohol messages can negate the harmful effects of disclosure. In this study, participants read vignettes describing conversations between a mother and an underage college student. The conversation included maternal disclosure of their own underage drinking, followed by either no message or one of three messages (i.e., disapproval, warnings, or a harm reduction message). We explored the impact conversations between a mother and a child have on participant's perceptions of these conversation partners. We looked at perceptions of relationship quality, parental permissiveness, student attitudes towards underage drinking, and perceived student alcohol consumption following the message. Based on previous research, the following was hypothesized: (1) compared to the disclosure only condition, those who receive disclosure paired with a harm reduction will perceive the relationship quality as greater, the mother as more permissive, the students as having more positive attitudes towards underage drinking, and students will drink more alcohol; (2) compared to the disclosure only condition, those who receive disclosure paired with a zero tolerance message or a warning message will perceive the mother to be less permissive and the students as having more negative attitudes towards underage drinking, and drinking less alcohol.

Introspection: Are People Aware of the Traits They Find Aesthetically Pleasing?

10:05-10:20am

Morghan Shoemaker, Leah Miller, Joceline Tavares, Tyler Maycumber, & Devin Heckler, DeSales University
Faculty Sponsor: Dr. Sarah Starling

Our implicit biases directly influence what we think is aesthetically pleasing, but we may not always be fully aware of our own preferences. Previous research has shown that individuals judge someone's personality based on the physical image presented to them (Naumann, et al., 2009). The goal of the present study was to determine whether a correlation exists between an individual's stated aesthetic preferences and their first impression of a person's face. Participants viewed fifty faces and rated their visual appeal on a 5 point rating scale from "not visually appealing" to "very visually appealing." Following the face-rating task, participants answered questions regarding their stated aesthetic preferences on the traits they find to be visually appealing. The questions addressed general features; hair color, eye color, ethnicity, gender, and facial hair on men. We hypothesized that there would be no relationship between a participant's stated preferences for particular features of a face and whether or not those features were present.

Cross-cultural Parental Support

10:20-10:35am

Drake Van Egdorn, Lehigh University

Faculty Sponsor: Dr. Christopher Burke

New parents acquire many new worries from bringing a baby into their life. They may not know how to change diapers, feed an infant, soothe a crying child, or properly incorporate a new family member into their daily schedule. Paid parental leave allows parents to take a step back, and successfully adapt to their new life without sacrificing their job. However, the United States stands as one of the last industrialized countries to not have paid maternity leave, and the United States lags far behind other countries in paternity leave (OECD, 2016). A cross-cultural analysis allowed me to compare parental support systems under different policies. For Study 1, I interviewed American, French, and Icelandic parents about parental support systems, parenting beliefs, division of domestic labor, and work environment. I drew from a Grounded Theory approach to analyze the interviews to identify the important issues and construct a stress and coping model of work-family balance (e.g. Strauss & Corbin, 1994). Study 2 included a survey of American, French, and Icelandic parents to test the work-family balance model. The survey results clarified how different support systems help parents achieve work-family balance. Lastly, I conducted community focus groups to share my results, examine the parental support systems in the Lehigh Valley, and provide suggestions for new parents to meet their support needs in the absence of formal paid leave policies.

Ignoring Salient Emotional Face Distractors in an Irrelevant Task

10:35-10:50am

Jennifer Tomany, Lehigh University

Faculty Sponsor: Dr. Nancy Carlisle

Over time, humans have evolved automatic attentional biases towards salient stimuli that likely aided in survival. Our attention is selective towards faces, emotional stimuli and, in particular, threatening faces. Previous literature suggests that this threat bias also seems to occur even when subjects are completing tasks irrelevant to faces. In addition to these stimulus-driven attentional biases, humans can bias their attention using top-down control to consciously direct where attention is deployed while ignoring irrelevant stimuli. In this study, we address the question: Can we use top-down control to override automatic attentional capture of threatening face distractors in tasks irrelevant to faces? Subjects reported where a gap was located on a diamond with face distractors present on the diamonds. In some trials, one distractor was an angry or happy face. Additionally, participants were given cues on half of the trials to warn them of the emotion of a face distractor that they should ignore. Our findings indicate that despite the presence of face distractors, subjects were able to ignore irrelevant face distractors through top-down control to complete the task, regardless if explicitly cued to ignore an emotional face distractor or not and regardless of the distractor's emotional expression. These findings contradict previous research by suggesting that face distractors, even threatening face distractors, can be ignored when completing a task irrelevant to faces through top-down attentional control.

**Poster Session: 11:00am-12:00pm
Marlo Room (2nd Floor, Farinon)**

Lehigh Valley Society for Neuroscience Posters

**1. Relationship Between Exercise and Conditioned Hyperactivity in Mice:
Importance of Temporal Contiguity**

Justina Warnick & Dylan Gilhooly, Dickinson College
Faculty Sponsor: Dr. Anthony Rauhut

The present experiment examined the importance of the temporal relationship between voluntary physical exercise (i.e., home-cage wheel running) and drug exposure on the acquisition and extinction of conditioned hyperactivity in mice. The experiment consisted of four phases: initial exercise, acquisition, extinction, and tests for sensitization. Upon arrival, male, Swiss-Webster mice (N= 60) were permitted access to wheels (Exercise) or not (Sedentary) for 6 weeks. For half of the exercise mice, they had the wheels for the entire duration of the exercise phase (EXE-EXE) whereas the other half had their wheels removed after 3 weeks (EXE-SED). For the sedentary mice, half of the mice remained without wheels for entire duration of this phase (SED-SED) whereas the other half were given wheels for the last 3 weeks of this phase (SED-EXE). Next, exercise and sedentary mice received an injection of saline or methamphetamine (1.0 mg/kg) prior to placement in the locomotor activity chambers for 5 consecutive sessions (acquisition) followed by 4 consecutive sessions in which mice received daily injections of saline prior to placement in the chambers (extinction). The results showed that mice that received 6 weeks of continuous exercise (EXE-EXE), and mice that received exercise for the first 3 weeks and then had their wheels removed (EXE-SED), showed a blunted pharmacological response and subsequent conditioned hyperactive response, compared to control mice. Collectively, these results suggest that early exposure to voluntary physical exercise retards the unconditioned and conditioned hyperactive responses to methamphetamine in mice.

2. Early Life Nutritional Stress Effects on Song and Auditory Region Size and Density in Zebra Finches of Both Sexes

Khulganaa Buyannemekh, Lafayette College
Faculty Sponsor: Dr. Michelle Tomaszewski

Adversity early in life can have lifelong consequences on brain and behavior. One way to examine the effects of early life adversity is to introduce stressors during development and test the effects on learning and the brain; many such studies have been conducted in birds. Most of these studies focus on song learning in males. Few examine females and few examine concomitant neural changes. Studies that have looked at the effects of developmental stress on song nuclei have reported mixed results. The present study investigated the effects of nutritional stress (NS) on brain region size and density in the primary song nuclei of male zebra finches (*Taeniopygia guttata*). Furthermore, we examined the effects of NS on auditory regions in females, as song perception is important for mate choice in female zebra finches, and song perception, like song, is a learned behavior. We assessed brain sections of zebra finches that have been bred under normal or NS conditions at two points during development and in adulthood. NS was induced by increasing the foraging time of the parents. Our hypothesis that NS birds would have smaller area and decreased cell densities in all brain regions compared to controls was not supported. Such research will help us understand how early life adversity affects learning and memory.

3. Characterization of the Relationship Between Diet and Mitochondrial Function in a *Drosophila* Epilepsy Model

Ashley St. John & Stephan Geneus, Lafayette College

Faculty Sponsor: Dr. Elaine Reynolds

Drosophila mutants known as “bang-sensitive” have been utilized as models for neurological conditions including epilepsy, sensorineural deafness, and age-dependent neurodegeneration. While the mechanisms producing these phenotypes are unique to each strain, some of the gene products suggest mitochondrial dysfunction as a possible underlying cause. Diet is an important factor in determining energetics. For example, a ketogenic diet has been shown to be an effective treatment for refractory epilepsy in humans, and antioxidant therapies have been explored in Parkinson’s disease. We wanted to more clearly define the connection between diet AND mitochondrial function in this fly model system. Bang-sensitive mutant strains were reared on a standard molasses, yeast and cornmeal (MYC), which is a low protein/high carbohydrate diet, or a protein-rich yeast sugar (1:1 YS) diet. The mutants display a lower percentage of seizures on the YS food, but also reduced viability and lifespan. Several biochemical methods were utilized to define the effects of diet, including a cytochrome oxidase (CO) assay and a citrate synthase assay. Preliminary results indicate reduced CO activity in mutants as compared to wildtype, with increased CO levels in all flies raised on the YS food. Alterations in mitochondrial function correlate with improvement in epilepsy phenotype.

4. Inhibition of the Crayfish Caudal Photoreceptor by an Opsinamide

Sarina Krantzler & Justin Ungerleider, Lafayette College

Faculty Sponsor: Dr. James Dearworth

The photoreceptive mechanism of the caudal photoreceptor (CPR), which is located in the ventral nerve cord of crayfish, has not yet been identified. We hypothesize that the photoreceptive mechanism could be controlled by melanopsin. To test our hypothesis, we measured responses by CPRs to light in presence of an opsinamide (AA92593), an inhibitor of melanopsin. Ventral nerve cords of *Procambarus clarkii* were dissected to expose the sixth abdominal ganglion and carryout extracellular recordings of action potentials from CPRs. Responses of CPRs to light were compared before and after application of crayfish Ringer treated with opsinamide. A preliminary trial done at 100 μ M suggested responses by CPRs were inhibited. To test effectiveness further, we reduced the concentration to 10 μ M and computed mean firing rates to ten repeated light presentations among six different preparations. Six additional preparations served as controls. In case of controls, Ringer was removed from the bathing dish and then simply returned. Responses by CPRs to light in opsinamide treated preparations were reduced from 52.16 Hz \pm 6.17 (standard error) to 43.84 Hz \pm 5.84, and responses of control preparations were reduced from 42.11 Hz \pm 9.25 to 37.32 Hz \pm 6.87. Overlapping standard errors indicate no significant difference. It is thought that the dose at 10 μ M is not great enough to observe inhibition. Application of 100 μ M opsinamide will be repeated to confirm or refute our preliminary observation that the opsinamide inhibited light responses of CPRs.

5. Quantification of Retinoids in Tissues of the Crayfish

Matthew Adusei, Metri Kumar & Michael Chejlava, Lafayette College

Faculty Sponsor: Dr. James Dearworth

Caudal photoreceptors (CPRs) are located in the sixth abdominal ganglion in the ventral nerve cord of crayfish and are thought to process circadian behaviors and backward walking. The photoreceptive mechanism underlying the response of CPRs is not known but could involve melanopsin. To have melanopsin functionality, CPRs must possess 11-cis retinaldehyde. The purpose of our study is to determine if 11-cis retinaldehyde is found in CPRs. Crayfish, *Procambarus clarkii*, subjected to approximately 1 hr of cryoanesthesia will be dissected. The CPRs will be removed from the 6th abdominal ganglion, tail muscles will be extracted from the abdominal region as a negative control, and eyestalks and brain will be dissected as positive controls. We will prepare and analyze standards, starting with retinyl palmitate. The next will be retinaldehyde in the all-trans form with both syn and anti-conformations. Retinaldehyde will then be isomerized with light to include the 11-cis form, and then fixed with hydroxylamine to get the oxime forms, which are less susceptible to light isomerization and breakdown. The extracted tissues will also be fixed with hydroxylamine to obtain any retinaldehyde oxime forms. We will then proceed to analyzing the tissue extracts for possession of retinoids and run them alongside the standards using an ultra-performance liquid chromatography mass spectrometer (UPLC - MS). If detected, the presence of the 11-cis retinaldehyde form would support the possession of opsins, including melanopsin, which could be involved in driving the photoreception of CPRs.

6. Influence of Pharmacological Inhibition of Melanopsin on the Pupillary Light Response in Turtles

Jeeda Ani & Richard Villa, Lafayette College

Faculty Sponsor: Dr. James Dearworth

Melanopsin is thought to be expressed in the iris and retina of the turtles and to play a role in controlling their slow pupillary light response (PLR). The purpose of this study is to investigate how inhibition of melanopsin affects the PLR in turtles. Red-eared slider turtles (*Trachemys scripta elegans*) were restrained to enable measures of the pupils by an infrared eye tracking system. Pupil sizes were tracked during two cycles of 30 minutes of dark followed by 10 min of light. Baseline trials (n=6) have been done on one animal. A control set of trials (n=3), which has included an intraperitoneal injection of inert vehicle dimethyl sulfoxide (DMSO), has also been done. Pupil sizes in response to light for baseline and control injections were $2.37 \text{ mm}^2 \pm 0.21$ (standard errors) and $1.84 \text{ mm}^2 \pm 0.35$, respectively, and were not statistically different. Moving forward we will use opsinamide (AA92593) to block melanopsin-dependant responses and analyze the effects on the PLR. We will compare the effects of DMSO injected animals to those injected with opsinamide dissolved in DMSO. Blockage of melanopsin activity through pharmacological inhibition is hypothesized to increase the PLR with a reduced amplification. The results of this study will provide more knowledge on how the pupil is controlled by melanopsin in turtles.

7. Impact of Caffeine on the Reinforcing Efficacy of a Sweetened Alcohol Solution

Gillian Baker, Ashmita Mukherjee, & Megan McVeety, Lycoming College

Faculty Sponsor: Dr. Sarah Holstein

In recent years, caffeinated energy drinks have become increasingly popular. However, when combined with alcohol, these caffeinated beverages have been associated with increased alcohol intake and a greater desire for alcohol. Although this caffeine-induced increase in alcohol drinking has been shown in both human and animal studies, it remains unknown whether caffeine may increase alcohol drinking and desire to drink by increasing the reinforcing efficacy of alcohol. Therefore, the purpose of the current study was to investigate the relationship between caffeine and the reinforcing properties of a sweetened alcohol solution in

rodents. Eight male Long Evans rats were trained to self-administer a lightly sweetened alcohol solution (10% v/v ethanol, 2% w/v sucrose) following a sucrose fading procedure. After stable responding for the sweetened alcohol solution was achieved, with the daily alcohol intake averaging 0.80 ($i \pm 0.11$) g/kg, rats received an intraperitoneal injection of saline or caffeine (2.5, 5.0, 10.0, 20.0 mg/kg) thirty minutes prior to the operant self-administration session. Caffeine, at a dose of 10.0 mg/kg, significantly increased alcohol-reinforced responding compared to saline, with a 67.4% increase in responding on the alcohol-reinforced lever. Although an overall increase in responding on the inactive lever was observed with caffeine, there was no significant increase in responding on the inactive lever at 10.0 mg/kg, compared to saline. These results indicate that a moderate dose of caffeine enhances the reinforcing efficacy of a sweetened alcohol solution, which may ultimately contribute to patterns of uncontrolled intake and a greater desire to drink in alcohol users.

8. Refining a Protocol for Assaying *Drosophila* Odor Preference

Elizabeth Vlattas, Muhlenberg College

Faculty Sponsor: Dr. Karen Menuz (University of Connecticut)

Olfaction plays an essential role in insect behavior, including the selection of human hosts over other animals by malaria-bearing mosquitoes. To understand and potentially manipulate odor-driven insect behaviors, we need to understand how they can be influenced by the molecular and cellular environment surrounding olfactory neurons. Because ammonia is a component of the odor that attracts mosquitoes to human hosts, it can serve as a valuable tool for studying odor preference in insects. To assay preference behavior, we tested *Drosophila* using a T-maze paradigm, which presents the insects with a choice to ambulate toward or away from a given stimulus. Wild-type *Drosophila* were exposed to a series of ammonia dilutions and water in a T-maze order to construct a dose-response curve for different concentrations of ammonia. We found that high concentrations of ammonia produced aversion and moderate concentrations produced attraction, with 0.1% ammonia as the most consistently attractive. Using 0.1% ammonia, we tested wild-type flies in a variety of conditions to refine the testing protocol in order to produce the most consistent results. We then collected preliminary data for *Drosophila* that lacked neurons expressing IR92a, a gene responsible for ammonia detection. By refining this protocol, the lab will be able to further explore how the molecular and cellular environment surrounding olfactory neurons contributes to insects' preference for ammonia.

9. Effect of Predictable Stress on Mice Behavior

Julia Kuehn, Saint Francis University

Faculty Sponsor: Dr. Shlomit Flaisher-Grinberg

Stress exposure has been demonstrated to affect a variety of physiological and psychological systems, increase susceptibility to illness and inflammation, and contribute to the development of pathological conditions such as depression, anxiety and dementia. However, it is currently unclear if exposure to prenatal or postnatal stress yield differential effects. To test this question, the current project exposed C57BL6/J mice to predictable prenatal and postnatal stress paradigms and evaluated its behavior in adulthood. Pregnant dams were exposed to cold water immersion and removal of bedding for 21 hours every other day, 7 days prior to birth, to simulate prenatal stress. Nursing females were separated from pups for 1 hour/day, 10 days after birth, to simulate postnatal stress. Control females were left undisturbed throughout pregnancy and after birth. Five weeks after the procedure was completed, 7 weeks old female offspring were tested using the open field, elevated plus maze and forced swim test. Results demonstrated a differential effect on behavior in experimental mice compared to control mice.

Further research on the effect of prenatal and postnatal stress on behavior will need to be conducted to support and interpret these findings.

10. Low-dose prenatal ethanol-exposure in CD-1 mice and prenatal bicuculline-exposure in Swiss-Webster mice induces deviations in exploratory behavior

Lauren D'Ortona & Theresa Mowad, Ursinus College

Faculty Sponsor: Dr. Carlita Favero

Individuals diagnosed with Fetal Alcohol Spectrum Disorder (FASD) display deficits in executive-planning and sensorimotor integration. FASD is the leading preventable cause of cognitive dysfunction, yet still affects 2-5% of the U.S. Low-dose prenatal ethanol-exposure (PrEE) is scarce in literature, thus we aim to identify persistent neurobehavioral deficits in PrEE CD-1 mice. To induce PrEE, one cohort of dams had voluntary access to 5-20% ethanol for 2-hours each gestational day. Resultant pups were tested using the Suok apparatus, in light and dark conditions, during adolescence (21-35 days old) and again during adulthood (121-138 days old); parameters such as side-looks, missteps/falls, and grooming (indicative of exploration, coordination, and anxiety respectively), were assessed. Adolescents displayed decreased coordination and anxiety, whereas adults displayed increased anxiety and coordination, in addition to decreased risk-assessment and exploration. Improved coordination may be correlated with decreased risk-taking and overall movement. Also, the delayed development of anxiety is analogous to late-onset comorbidity of anxiety and FASD in humans. Ethanol, an agonist of GABA, the brain's major inhibitory neurotransmitter, binds to GABA receptors and inhibits neuronal signaling, whereas bicuculline, an antagonist, blocks inhibitory action. To further assess mechanisms of PrEE on the developing brain, the CD-1 mice were compared to juvenile Swiss-Webster mice whose mothers were injected with 1 ug/kg body weight of bicuculline on gestational days 10-18. Ethanol-exposed and bicuculline-injected juveniles both exhibited increased exploration compared to controls. Therefore, further assessment of bicuculline's effects on GABA receptors could potentially provide insight into the mechanisms underlying cognitive dysfunction secondary to PrEE.

11. The Role of the Endocannabinoid System in Zebra Finch Courtship and Pair Bonding Behaviors

Emily Fidlow, Lafayette College

Faculty Sponsor: Dr. Michelle Tomaszynski

Cannabinoids, like marijuana, are implicated in a wide variety of behaviors, including cognition. Although cannabinoids are thought to impair learning and memory, studies across species, including humans, have demonstrated protective effects of cannabinoids on cognition. In zebra finches, a monogamous and gregarious, songbird, cannabinoid receptors are found throughout song and auditory regions throughout development. Since song and song preferences (auditory responses), as well as vocal exchanges between partners, are critical for the formation of zebra finch monogamous pair bonds (indeed, females choose males on the basis of song quality), we hypothesized that blocking or enhancing the activity at cannabinoid receptors would alter courtship and pairing behaviors in this species. To test this, we administered a cannabinoid agonist (0.1 mg/kg of WIN55212-2), a CB1 antagonist (3 mg/kg of SR141716A), or a control injection (DMSO) into the pectoral muscle of sexually inexperienced male and female zebra finches and tested them in mixed sex aviaries. Birds were observed for courtship singing, courtship responses, and pair bonding behaviors (direct physical contact, grooming, and nest building). We also observed feeding as a general activity marker. Very little is known about the

mechanisms of pair bonding, and this research contributes to our understanding of the neurobiological mechanisms for forming such relationships.

12. Think Before You Choose: Decision-Making and Anxiety Vulnerability in a Spatial Discrimination Task

Michael Luethke, Lafayette College

Faculty Sponsor: Dr. Meghan Caulfield

The hippocampus is recognized for its essential role in learning and memory, and in particular spatial learning and memory. Using a hippocampally mediated pattern separation task of spatial discrimination recent research found that individuals with post-traumatic stress disorder (PTSD) perform better when spatial discrimination is difficult than similar individuals without PTSD (Caulfield & Myers, PeerJ, in press). To evaluate if enhanced spatial discrimination is a risk factor for clinical anxiety, healthy adult participants with self-reported risk for anxiety completed a delayed match-to-sample discrimination task. We hypothesized that similar to those with clinical anxiety, healthy young adult participants at-risk for anxiety disorders would show enhancement of discrimination performance compared to low-risk participants. Participants completed a task of visuospatial pattern separation called the “Dots” task. The task measures spatial discrimination ability using a delayed match-to-sample choice for spatial location. Overall, we observed a significant difference of difficulty level. Furthermore, while high-risk participants did not respond more accurately as expected, we observed an interaction of reaction time and risk group. Our results suggest that possible differences in decision making processes may play a role in anxiety vulnerability. Our results didn't support our hypothesis that anxiety vulnerability would improve spatial discrimination. We observed a significant interaction of reaction time and anxiety vulnerability provides new evidence supporting recent research that decision making processes may be different not only in clinical anxiety as previously observed, but also in anxiety vulnerability.

13. Individual Differences in Spatial Pattern Separation Performance is Associated with Anxiety Vulnerability in Healthy Young Adults

Alexandra Vogel & Mia Coutinho, Lafayette College

Faculty Sponsor: Dr. Meghan Caulfield

Pattern separation is the ability to discriminate among similar experiences. This is important in episodic memory and is believed to require the hippocampus. Previous research has demonstrated that hippocampal structural differences may play a key role in risk for developing post-traumatic stress disorder (PTSD; Gilbertson et al., Nature Neuroscience, 2002). For our experiment, we varied the degree of input similarity (mnemonic similarity) of photos of everyday objects to examine whether differences in performance on a hippocampal pattern separation task is evident in healthy young adults at-risk for anxiety disorders. We hypothesized that high risk for anxiety participants would perform better in the most difficult (i.e. most similar) trials. To measure anxiety risk, participants filled out a measure of behavioral inhibition, the Adult and Retrospective Measure of Behavioral Inhibition (AMBI/RMBI). Behavioral inhibition has been linked to increased risk for developing anxiety disorders and AMBI has previously been used to examine learning and memory differences in associative learning tasks. Participants were presented 90 photos of objects that were new (“new”), exactly the same as learning (“old”), or similar to previously encoded objects during the “test” phase. “Similar” images were defined as being the same object but having different color or positioning, than previously shown image. A 4 x 2 mixed measures ANOVA with within-participants factor of similarity (L1, L2, L3, L4) and between-groups factor of AMBI group (High, Low) indicated a significant main effect of difficulty

level, $F(3,87) = 4.561$, $p < .001$, with post-hoc pair-wise comparisons supporting that as similarity gets more difficult, participants performed worse overall. Interestingly, participants with high behavioral inhibition performed better when discriminating the most difficult similar trials.

14. Self Esteem and Empathy Influence Emotional Responses to Unfamiliar Music

Laura Edelman, Christine Cimpian, Erik Berger, Sara Reibschied, Kayleigh Scott,
Caroline Rafizadeh, & Brandon Copping, Muhlenberg College
Faculty Sponsor: Dr. Laura Edelman

Several studies indicate that the general population responds more to the melody of songs in comparison to the comprehension of the lyrics when it comes to listening to music (Peynircioglu, Rabinovitz, and Thompson, 2008; Ali and Peynircioglu, 2006). The message of the lyrics is not always consistent with the tone of the melody. In this experiment we are interested in the different perceptions of music compared to responses to the Rosenberg Self Esteem scale and the Interpersonal Reactivity Index (IRI). Previous research on emotional responses to music has been associated with both self esteem and empathy (Eerola, 2016 & Shepherd 2015). We expect to find that people who have high self-esteem will tend to notice positive emotions in music more than those who have low self-esteem. Those who have high levels of empathy will be more sensitive to the emotionality of the music than people who have low levels of empathy. Unfamiliar songs were researched and selected according to four different categories (happy melody, sad lyrics; happy melody, happy lyrics; sad melody, happy lyrics; and sad melody, sad lyrics). Data was collected using Muhlenberg's SONA system and participants completed the Rosenberg Self-Esteem Scale (RSES) and the Interpersonal Reactivity Index (IRI). Participants listened to twelve short clips of the chosen songs and were asked to rate them on 4 semantic differentiation scales, answering questions such as, "How familiar are you with this song?" for happiness, excitement, familiarity, and likeability using a 1-8 scale. Once finished, the participants answered basic demographic questions.

15. Incorporating Advocacy in Brain Awareness Service Learning Programs Using a Liberal Arts Approach

Joseph Ryan, Benjamin Seitz, Marissa Cusimano, Kelly O'Hanlon, Adriana Facchiano,
& Michael Palmeri, Moravian College
Faculty Sponsor: Dr. Cecilia Fox

For years, Moravian College and the Lehigh Valley SfN Chapter have developed a series of brain awareness outreach programs designed to promote public awareness of the functions of the nervous system and benefits of neuroscience research through a liberal arts lens. Our unique approach of incorporating a liberal arts view allows us to share our appreciation for how disciplines such as philosophy, foreign language and music are able to contribute to a more thorough understanding of cognition and motor function. By incorporating our interdisciplinary background, we sponsor events such as our Brain Awareness Seminar and Film series, Advocacy Days and lab tours, which not only bring awareness to the benefits of scientific research, but also create substantial changes by encouraging Pennsylvanian representatives to support scientific funding initiatives. Without a liberal arts education, we do not believe that we would be as successful in embracing and encouraging change as we are today. We highlight several of our programs and strategies for implementing our service learning programs. The leadership and communication skills that our students have developed have motivated them to become civic leaders and catalysts to inspire a lasting change within our community.

16. Hypericum Perforatum and Crocin Exhibit Dose-Dependent Free Radical Scavenging Activity in a Cell-free Assay Used for Testing Candidate Molecules for Neuroprotective Function

Ashley Ross, Adriana Sorrentino, & Ayana Brown, Cedar Crest College

Faculty Sponsor: Dr. Audrey Ettinger

Neurodegenerative diseases are a major cause of disability and death for millions of people worldwide, and current treatment options are limited. Since neurons do not have the ability to regenerate like other cells in the body, it is crucial to identify approaches, including prophylactic medications that can provide neuroprotective properties to central nervous system neurons. This study is focused on testing herbal remedies, such as Hypericum perforatum and crocin, in a cell-free environment to directly measure their antioxidative function. Over-the-counter Hypericum perforatum and chemical-grade crocin were tested in a spectrophotometric free radical scavenging assay to determine the average percent radical scavenging of each substance. The free radical tested was hydrogen peroxide, a chemical known to induce apoptotic cell death similar to that caused by stroke. After several trials performed in triplicate, a dose-dependent relationship between the concentration of Hypericum perforatum and percent radical scavenging was observed. Initial assays using crocin also suggest a dose-response relationship. Future experiments will test these herbal remedies in vitro utilizing primary cell cultures of chicken neurons to determine whether the antioxidant properties provide neuroprotection from apoptosis induced by hydrogen peroxide. RNA isolation and PCR arrays will allow us to test the regulation of genes involved in apoptosis to determine specific mechanisms by which these herbal remedies may provide protection from cell death.

17. Melding Mind and Machine: Robot Navigation Using a Wireless Brain-Computer Interface Device

Ashley Goresnik, Brian Smith, McKenna Schimmel, & Sarah Blitz, Lafayette College

Faculty Sponsors: Dr. Lisa Gabel and Dr. Yih-Choung Yu

Brain-Computer Interfaces (BCIs) offer alternate means of motor control and communication for those with severe motor impairments and disabilities. By way of a neurofeedback loop, users learn to modulate neural signals to control a specific computerized paradigm. Non-invasive EEG-based BCI is one of the most practical methods for creating a daily-use BCI due to high temporal resolution while remaining lightweight and inexpensive. Synchronization of neuronal electrical activity results in distinct rhythms, such as the alpha wave, which is associated with relaxation and an idling state of the visual cortex. In this study we utilized an asynchronous (self-paced) hybrid BCI device which employs a wireless EEG headset with a gyroscope for a low-cost, easy-to-use design to control a ground-based device through a computer. This design has been implemented with a small robot and a full-size wheelchair. We examined the ability of participants (n=20) to navigate an obstacle course using the BCI, and determined whether performance improved with repeated training over a two-day procedure occurring within 24 to 48 hours. Following training, participants were asked to navigate the robot through an obstacle course designed to mimic a real-world scenario. Results from this study demonstrate that participants perform as well on the first day of testing as they do on the second day. All participants were able to successfully navigate through the course following a training period. High user success rates and short training times suggest that this wireless BCI device has potential to reach a broader population for use with various applications.

18. Understanding Perceptually Ambiguous Images

Ashley Carey, Lafayette College

Faculty Sponsor: Dr. Elaine Reynolds

Throughout daily life, our brain is constantly interpreting visual stimuli that are presented to us within our environment. Although a majority of visual stimuli are easily identified by the brain, some stimuli appear to be more ambiguous and cannot be easily categorized under a single identity. Double images are effective examples of ambiguous images that produce a sensation that feels as if multiple interpretations of an image are fighting for attention within our brains and access into the brain's consciousness. Although the existence of this perceptual phenomenon is certain, the underlying neural mechanisms that resolve perceptual ambiguity remain unknown. Through the exploration of the visual pathway, specialized perceptual brain regions, memory, attention, and bi-stable rivalry, my research aims to understand where perceptually ambiguous images are determined along the visual pathway and what brain regions or activities are correlated with this resolution of ambiguous visual stimuli. This investigation will then be applied to understanding an ambiguous image that I created and a research study involving the further exploration of perceptual ambiguity and its underlying neurological processing.

19. Effects of Personalized Music on Cognition in Dementia Patients: The Music and Memory Pilot Study

Benjamin Seitz & Margaret Jones, Moravian College

Faculty Sponsor: Dr. Cecilia Fox

The MUSIC and MEMORY Program is a non-profit organization that uses personalized music to improve the quality of life of the elderly who may be living with dementia or Alzheimer's disease. Family caregivers and elder care professionals are trained to introduce this personalized music via playlists on iPods and other digital audio devices to these individuals to enhance cognition. Music is known to become associated with an event from a person's life so that hearing this specific piece of music years later evokes memories of the original experience (Simmons-Stern et al, 2012). Furthermore, additional research has demonstrated that listening to personalized music is able to significantly reduce states of anxiety within the elderly living with dementia and Alzheimer's disease, thereby improving their quality of life (Irish et al, 2006, Guetin et al, 2009). The current pilot study was designed to measure changes in cognition through regulated listening sessions of personalized music for residents in the Phoebe Richland Home, Quakertown PA. Sessions were 30 minutes in duration twice a day, every other day over a 5-week period. An experimental and control group (n=20 per group) were formed by randomly assigning residents with medically documented dementia to either group. The Addenbrooke's Cognitive Examination (ACE) was determined to be an effective measure of changes in cognitive impairment in this population and became the assessment tool for gathering quantitative data for this study. Family and staff anecdotes regarding changes in cognition and social interaction were also noted.

20. Molecular Dissection of Fatty Acid Derivative Oleamide Modulation of the Gamma-Aminobutyric Type A (GABAA) Receptor

Crystian Massengill & Patrick Maehler, Muhlenberg College

Faculty Sponsor: Dr. Jeremy Teissere

The gamma-aminobutyric acid type-A receptor (GABAAR) is the major inhibitory receptor present in the body, responsible for both synaptic and extrasynaptic chloride conductance. It possesses structurally and functionally well-characterized allosteric binding sites for many anxiolytic and hypnotic modulators such as benzodiazepines, barbiturates, general anesthetics, and neurosteroids. In comparison, little is known about the physiology and binding sites of, and

active ingredient(s) in, naturally occurring phytoextracts historically considered to cause such behavioral modulation. This research explores the effects of phytoextracts common in folk medicine on the physiology of this receptor. Previous work has shown that an extract of Passionflower (*P. incarnata*) modulates the receptor through direct activation and potentiation of $\alpha 1\beta 2\gamma 2$ and $\alpha 1\beta 2$ GABAARs, and described several transmembrane residues that affect the extract's ability to potentiate IGABA. The fatty acid derivative Oleamide has long been implicated in putatively GABA-ergic behavioral modulation, but little has been done to elucidate its effect on the receptor. This compound was explored as a potential active ingredient in the Passionflower extract responsible for the observed modulation. We performed two-electrode voltage clamping of *Xenopus laevis* oocytes expressing wild-type $\alpha 1\beta 2\gamma 2$ GABAARs. Our initial findings show that Oleamide does not directly gate the channel, but the compound does attenuate IGABA. We also found that our solvent Dimethyl sulfoxide (DMSO) attenuates IGABA. Further work is being performed to find an alternative. Understanding the relationship between these extracts and GABAARs significantly increases our understanding of the structure and function of the receptor as well as the underpinnings of its pharmacological sensitivity.

21. Zizyphi spinosi Semen is a Modulator of the Gamma-aminobutyric Acid Type A Receptor

Sapir Mashiach, Muhlenberg College
Faculty Sponsor: Dr. Jeremy Teissere

The gamma-aminobutyric acid type A receptor (GABAAR) is responsible for mediating synaptic and extrasynaptic inhibitory chloride conductances in the central nervous system. It contains allosteric binding sites for a variety of anxiolytic and hypnotic modulators, including benzodiazepines, barbiturates, and pregnane neurosteroids. However, little is known about the putative physiology of anxiolytic and hypnotic plant-based extracts commonly used in folk pharmacology. Zizyphi spinosi semen (ZSS), the mature seed of jujube, is a Chinese Traditional Medicine historically used to treat insomnia and anxiety. Although ZSS is known for its behavioral anxiolytic effects, the molecular target of its action is unknown. Our research demonstrates that ZSS acts directly on GABAARs. We performed two-electrode voltage clamping of *Xenopus laevis* oocytes expressing wild-type $\alpha 1\beta 2\gamma 2$ and $\alpha 1\beta 2$ GABAARs to test whether the ZSS extract - as well as its putative active ingredient, sanjoinine A - is able to directly activate and/or allosterically modulate key isoforms of the GABAA receptor. We show that ZSS directly activates and potentiates $\alpha 1\beta 2\gamma 2$ -expressed oocytes in a dose-dependent manner. We also show that ZSS does not directly activate $\alpha 1\beta 2$ GABAARs, suggesting the importance of $\gamma 2$ -containing receptors in conferring sensitivity to ZSS. Using site-directed mutagenesis, we have begun to identify $\gamma 2$ residues that may confer sensitivity to ZSS. Our findings contribute novel information to the currently expanding body of knowledge on the role of herbal medicine as an anxiolytic and hypnotic modulator of the GABAAR, as well as the structural underpinnings of the GABAAR pharmacological sensitivity.

22. A Putative Binding Pocket Mediating Flavonoid Modulation of The GABAA Receptor

Joshua Lucas, Katie Perrotta, Dr. Christine Ingersoll, & Dr. Keri Colabroy, Muhlenberg College
Faculty Sponsor: Dr. Jeremy Teissere

Gamma-aminobutyric acid type A receptors (GABAARs) are the major inhibitory neurotransmitter receptors in the central nervous system. The GABAAR is sensitive to allosteric potentiation by compounds found naturally in anxiolytic and hypnotic plants. HPLC analysis of

one such plant, *Passiflora incarnata*, revealed the presence of a class of compounds, flavonoids, as potential GABAergic ligands. Flavonoids are thought to be responsible for, at least in part, mediating the anxiolytic and hypnotic effects of these plants. Contrary to these speculations, however, the current study reveals that certain flavonoids are capable of attenuating GABA induced inhibitory currents, rather than inducing or potentiating these currents. Two-electrode voltage clamping of *Xenopus laevis* oocytes expressing $\alpha 1\beta 2\gamma 2$ GABAARs demonstrated that the flavonoid apigenin attenuates GABA elicited currents. Chrysin, another flavonoid, was demonstrated to have no effect on the GABAAR. The high degree of similarity between the structures of apigenin and chrysin, and yet their largely different effects on the GABAAR, may be indicative of a novel binding pocket on the GABAAR specific for these compounds. In silico docking of apigenin on a constructed GABAAR homology model identified a putative binding site for flavonoids on the receptor.

23. Effects of Visuospatial Distraction on Episodic Memory in Virtual Reality

Benjamin Levin, Alison Bashford, & Rebecca Shear, Muhlenberg College

Faculty Sponsor: Dr. Gretchen Gotthard

Memory is a crucial process, but can often be a burden, acting as the mechanism behind post-traumatic stress disorder (PTSD). In PTSD, traumatic episodic memories are re-lived regularly, intruding upon the sufferer's mind and evoking undesired emotions. This disorder has been treated using drugs (e.g., propranolol) along with reconsolidation techniques to lessen emotional reactions to the trauma. However, non-drug alternatives remain desirable due to the side effects that often accompany drug treatments. A relevant and promising theory is the working memory capacity theory of memory consolidation, which suggests that overloading working memory can result in disruptions to memory consolidation. In particular, visuospatial tasks (e.g., Tetris) have been shown to be effective at overloading working memory and disrupting memory recall. In the present study, participants played Auto Mechanic Simulator in the virtual reality game Job Simulator. They then either played Tetris or engaged in a non-visuospatial control task (dual-digit multiplication). Finally, participants filled out three memory tests (i.e., free recall, cued recall, and recognition) assessing their episodic memories of Job Simulator. Results showed a trend toward lower scores on free recall in the Tetris group [$t(28)=1.557$, $p(\text{one-tailed})=0.065$, $d=0.569$]; they remembered fewer items/orders of activities on average. Cued recall and recognition memory were not affected in the control or Tetris groups. These results add to a growing body of evidence in support of the working memory theory and the notion that visuospatial distractors can serve as effective non-drug manipulations for disrupting memory consolidation.

24. Caffeine Consumption Among Undergraduate Students: Do Students Increase Caffeine Consumption Upon Entering College?

Miranda Reed, Saint Francis University

Faculty Sponsor: Dr. Shlomit Flaisher-Grinberg

The field of psychopharmacology studies the effects of drugs on the physiological and psychological functioning of human and non-human subjects. Caffeine, a central nervous system psychostimulant, is consumed by 80-90% of the adults in the US on a regular basis. With the increase of caffeine availability in various products (e.g., beverages), it is important to investigate the topic of caffeine consumption in different age groups. Research focusing on the student population, has traditionally investigated the effects of caffeine on student's sleep, stress and health parameters. It is unclear, however, what are the environmental factors which may predict an increase of caffeine consumption in students. The current project aimed to

evaluate whether students increase their caffeine consumption upon entering college. A survey was administered to undergraduate students at Saint Francis University. All students were males and females with varying levels of undergraduate education; 56 freshmen, 7 sophomores, 2 juniors and 10 seniors. The finding demonstrated that the majority of students indicated that they did increase their caffeine consumption once they entered college. Over half the students reported that by drinking caffeine they felt more alert and energized. Surprisingly, the majority of students did not use caffeine when an exam was approach, but seemed to rather prefer caffeine as a source of morning energy. These findings could indicate that students during their freshman year are more susceptible to the development of caffeine consumption. Further research is required in order to identify some of the reasons which may contribute to these findings.

LVAIC Posters

25. Dynamical concurrent variable interval schedules

Michael Shiffert, Phillip Parham, Samantha Richards, Kendall Contri, Maria de la Luz Pineda, Adrianna Valentin, Sarah Rubino, & Leslie Villaverde, Lafayette College
Faculty Sponsor: Dr. Robert Allan

The study of concurrent schedules demonstrated that, over many choice observations, a matching law could be used to predict distributions of responses across two or more choice given the payoff on each choice. Previous research involved the use of single, unchanging schedule of payoff for each choice. To demonstrate the measurement sensitivity of the matching law in accounting for choice behavior, the present research extended research on dynamically changing payoff rates for each choice. Results suggest that, as payoffs change so does the accumulation of behavior on those choices across time. This research also extends previous findings in which changes in payoffs extended over 300-s - one choice started paying off at a rich level and the other started at a lean payoff level. Over the 300-s cycle the payoff rates changed continuously, the rich becoming lean, and the lean becoming rich by cycle's end. The present work extends these findings by arranging payoffs on one choice that range from lean to rich and back to lean while the second choice ranged from rich to lean to rich. We also manipulated the cycle time as being either 300-s or 600-s.

26. Antecedents and Consequences of Work-Nonwork Imbalance

Christopher Felix, Lafayette College
Faculty Sponsor: Dr. Andrew Vinchur

Many organizations today are trying to achieve work-nonwork balance for their employees to attract top talent, maintain high worker productivity, and reduce worker burnout. An individual's work and his or her outside of work life serve as a zero-sum consequence, where the more time that is devoted to one area takes away from the other. As a result, people may feel the negative consequences that are accompanied by the imbalance of work and life. Negative consequences include absenteeism, worker burnout and turnover, stress, and a lower level of life satisfaction. As college students maneuver their academic lives, they are also at risk of experiencing factors that affect work-nonwork balance. The current study explores the different factors that may affect work-nonwork balance and the consequences that may arise if college students are in a state of imbalance. A 72-item self-report scale was constructed to measure the work-nonwork balance in college students and factors that affect it. Hypotheses include that high levels of negative workaholism will be associated with high reports of burnout, stress, and work-nonwork imbalance, increased role conflict will be associated with increased burnout, and high levels of life satisfaction will be related to better time management and role balance.

27. Life Event, Hassle, and Organizational Stressors as Related to Psychological, Physical, and Behavioral Manifestations of Stress in Undergraduates

Charlotte Jamieson, Lafayette College

Faculty Sponsor: Dr. Andrew Vinchur

Stress is difficult to research because there are multiple definitions and it is an ambiguous term (Rabkin & Struening, 1967; Sonnentag & Frese, 2003). Holmes and Rahe (1967) took the broad term of stress and defined it as a reaction to a change in what is considered to be normal due to a major life event or minor event, referred to as a daily hassle, rather than basing it on the desirability of a situation (Dohrenwend, 1973; Holmes & Rahe, 1967; Rabkin & Struening, 1976). These life event and hassle stressors, as well as organizational stressors, defined by McGrath (1976), can affect an individual on a physiological, psychological, or behavioral level (Sonnentag & Frese, 2003). The current study will examine these different stressors and their related manifestations experienced through a survey in a sample of undergraduates as well as evaluating the Undergraduate Stress Questionnaire (USQ) created by Crandall, Preisler, and Aussprung (1992). Based on previous studies, we predict that stressors from the organization will be related to different manifestations of stress. We also predict that life events will be more related to behavioral manifestations of stress compared to hassles (Burt & Paysnick, 2014). However, hassles will be more related to physiological (DeLongis et al., 1982) and psychological (Kanner et al., 1981) manifestations of stress compared to life events (Cohen & Hoberman, 1983). Last, we predict that the different class years will experience similar levels of perceived stress but the experienced stressors between the two groups will differ (Dusselier et al., 2005; Hudd et al., 2005).

28. What Mediates the Relationship Between Helicopter Parenting and Autonomy Support and Helicopter Parenting and Depression and Anxiety?

Anna Pohoryles, Lafayette College

Faculty Sponsor: Dr. Susan Wenze

Helicopter parenting refers to parental over-involvement, including solving problems for one's children and meddling in their interpersonal relationships. Most of the existing research suggests that helicopter parenting has negative mental health effects on college students. However, no studies have explored why this is true. This study seeks to investigate this dilemma. Participants were 104 college students (78% female, 64% Caucasian). We used the following self-report measures: HPA scale to test for autonomy support and helicopter parenting as predictors; ERQ, AAQ, and BEAQ scales to measure the potential mediating effects of reappraisal and suppression (ERQ), psychological flexibility (AAQ), and experiential avoidance (BEAQ); and the CESD and GAD-7 scales to measure depression and anxiety as outcomes, respectively. The relationships between autonomy support and depression and between autonomy support and anxiety were mediated by reappraisal, psychological flexibility, and experiential avoidance. Suppression only mediated the relationship between autonomy support and depression. The relationships between helicopter parenting and depression and between helicopter parenting and anxiety were mediated by experiential avoidance (all $p < .05$). College students in emerging adulthood experience a period of transition to meet developmental goals. Therefore, parental support is likely beneficial for students in adjusting to adulthood, but only to a limited degree. Our results suggest that gaining independence from one's parents may foster a greater sense of self-efficacy, particularly in terms of ability to manage one's emotions, thereby supporting mental well-being.

29. Effects of Background Noise on Spatial Rotation Performance

Olin Perkins, DeSales University

Faculty Sponsor: Dr. Sarah Starling

Students in college and high school regularly study while listening to noise in the background from television, music, or background sound in the home. These sounds may influence their performance depending on how much attention they draw; for example, a television show may be more taxing on a student's attention than sounds of keyboards typing in a computer lab. The present study examined our hypothesis that listening to an audio track in a person's native language would be more draining on their attention than listening to audio in a foreign language or background noise. To test this, participants completed spatial rotation tasks through PsychoPy while listening to three different audio tracks, one in their native language (English), one in a foreign language (Thai), and one of background office noise. If listening to English draws more auditory attention than other sounds, then we should find that accuracy and speed are lower in that condition as compared to the other two auditory conditions. The results partially supported our hypothesis. Although the audio a participant listened to had no effect on the accuracy of their answers, $F(2,30)=0.73$, $p=0.49$, it did have an effect on the speed at which they completed the spatial rotation trials, $F(2,30)=4.25$, $p<0.05$. Participants performed significantly slower while listening to English (2.94 seconds) than while listening to office sounds (2.45 seconds), $p<0.05$. Average time while listening to Thai (2.87 seconds), did not differ from the other two conditions. This suggests that having recognizable words in the background impairs cognitive performance.

30. How Transitions Organize Memory for Personally Experienced Events

Allison McHayle & Dorte Kirkegaard Thomsen, Lafayette College

Faculty Sponsor: Dr. Jennifer Talarico

Autobiographical memory (AM) is the recollection of events from an individual's personal past. Individual autobiographical memories contain information about where you were, what you were doing and what emotions were experienced. Currently, there are two dominant theories that describe how AM is organized. In Transition Theory, AM is structured by transition events. Each memory includes event components (e.g., people, places and objects). As transition events occur, new components are added and old ones are subtracted. Each transition event is then used as a marker to remember other events from an individual's life. Alternately, Lifetime Period Theory organizes memory into a hierarchy of temporal periods. In this case, there are long-term periods (e.g., when I was in college) that contain many shorter specific event memories. Importantly, these lifetime periods can be subjective as well as objective and both can help guide recall of events. In this study, we used the quasi-independent variable of whether marriage coincided with objective (i.e., cohabitation) changes or not to see if AM organization was differentially influenced by the nature of the event. Participants were individuals who were (or had been) married. Transition Theory predicts that objective changes would be more important to organization of AM whereas Lifetime Period Theory allows for subjective changes to influence AM organization. Participants were asked to generate specific autobiographical memories in response to several word cues and then were asked to date those events using a speak-aloud protocol. Subsequently, those protocols were analyzed for use of the marriage event as a marker for additional event recall. Although the wedding was rarely mentioned in the dating protocols, it was mentioned twice as often by those who did not cohabit before marriage than by those who did, suggesting that objective changes may be more influential to AM organization than subjective changes.

31. Acceptance of Self-Driving Cars: a Factor Analysis Approach

Jiewei Zhang, Lafayette College
Faculty Sponsor: Dr. Michael Nees

In the light of increasing popularity of automated vehicles, more research is needed to investigate the public's perception of self-driving cars. To date, various studies have been carried out to examine opinions toward self-driving cars. We investigated how various dimensions influence perception of self-driving cars in an attempt to develop a comprehensive model of factors that could influence the adoption and use of self-driving cars. This study used exploratory factor analysis to identify meaningful factors underlying peoples' acceptance of self-driving cars. Factor analysis identified eight underlying dimensions of acceptance of self-driving cars: overall optimism toward vehicle automation, overall pessimism toward vehicle automation, perceived usefulness of vehicle automation, perceived usability of vehicle automation, enjoyment of manual driving, concern over retaining control of the vehicle, perceived social status implied by owning an automated vehicle, and general perceived self-competence with technology. These results may guide future research on acceptance of self-driving cars.

32. Lord of The Words: Does Interference Travel Across Different Contexts?

Christian Hillegas, Noah Haber, Larrisa Miller, & Jared Dashevsky, Lehigh University
Faculty Sponsor: Dr. Pat O'Seaghdha

Semantic interference is a phenomenon in which naming taxonomically related items (e.g., Birds) or items belonging to a common theme (e.g., Hiking) cumulatively slows down the naming of subsequent related items. In this experiment, we investigated the learning mechanisms of interference by exploring whether or not interference transfers across these different contexts. If transfer occurs, semantic interference is cumulative not only within a context, but across different contexts. Participants named multiple sets of four related or unrelated items cyclically in two taxonomically related phases separated by a thematic/situational phase. Within each related set, three pictures were Base items (occurring only in that condition) and one item was a Transfer item which migrated across conditions. As expected, we found interference among taxonomically related items in phase one. In phase two (situational), we observed less strong interference, but more importantly, no additional carryover interference for the transfer items. In phase three, the transfer items unexpectedly showed less interference than the base items. This result suggests that, contrary to learning accounts, interference does not cumulate across taxonomic and situational contexts. Nonetheless, transfer items were affected in other ways by their migration across contexts.

33. Taking the Synchrony Out of Singing

Rosemary Corcoran, Abigail Hedrick, Chrystina Obleschuk, Alyssa Scartozzi, & Jacob Sonnenklar, Muhlenberg College
Faculty Sponsor: Dr. Laura Edelman

Previous research found that synchronous music and synchronous movement increased perceptions of bonding (Edelman & Harring, 2016). Using a 4-group design, the current study investigated the effects of different types of singing on social bonding. Three confederates participated in each condition along with one participant. Confederates and participants sang all in unison, by pairs in rounds, only one confederate in unison with the participants, and none in unison with the participants. At the end of the manipulation, the participant and confederates completed a questionnaire to measure entitativity, rapport, mood and manipulation checks. We found that the more asynchronous each condition became, the more socially bonded the

participants felt to the confederate who performed in unison with them in the condition. However, in the asynchronous condition, the participant was not significantly bonded with any of the confederates. Results will be discussed in terms of factors that affect group cohesion and underlying neural mechanism that support social bonding.

34. Self Esteem and Empathy Influences Emotional Reactions to Pop Music

Laura Edelman, Erik Berger, Christine Cimpian, Brandon Copping, Caroline Rafizadeh, Sara Reibscheid, & Kayleigh Scott, Muhlenberg College
Faculty Sponsor: Dr. Laura Edelman

Several studies indicate that the general population respond more to the melody of songs in comparison to the comprehension of the lyrics when it comes to listening to music (Peynircioglu, Rabinovitz, and Thompson, 2008; Ali and Peynircioglu, 2006). The message of the lyrics is not always consistent with the tone of the melody. In this experiment we are interested in the different perceptions of music compared to responses to the Rosenberg Self Esteem scale and the Interpersonal Reactivity Index (IRI). Previous research on emotional responses to music have been associated with both self esteem and empathy (Eerola, 2016 & Shepherd 2015). We expect to find that people who have high self-esteem will tend to notice positive emotions in music more than those who have low self-esteem. Those who have high levels of empathy will be more sensitive to the emotionality of the music than people who have low levels of empathy. Pop songs were researched and selected according to four different categories (happy melody, sad lyrics; happy melody, happy lyrics; sad melody, happy lyrics; and sad melody, sad lyrics). Data was collected using Muhlenberg's SONA system and participants completed the Rosenberg Self-Esteem Scale (RSES) and the Interpersonal Reactivity Index (IRI). Participants listened to twelve short clips of the chosen songs and were asked to rate them on 4 semantic differentiation scales, answering questions such as, "How familiar are you with this song?" for happiness, excitement, familiarity, and likeability using a 1-8 scale. Once finished, the participants answered basic demographic questions.

35. Effects of Attitudes Surrounding Justice/Injustice toward Capital Punishment

Julia Cohen, Liza Castello, Grace Lingenfelter, & Hannah Cohen-Oppenheimer, Muhlenberg College
Faculty Sponsor: Dr. Alexandra Frazer

This study investigated the effects of attitudes toward capital punishment on decisions surrounding previous death penalty sentences. We wanted to look specifically at how support of capital punishment by Muhlenberg College students, affects the decision-making process when asked about previous court cases that included the death penalty in the resulting sentence. We use MouseTracking software to document and follow the active decision-making process that goes on in different individuals' minds that will eventually contribute to the ultimate decision of if the death penalty is warranted in certain situations, or cases. Data collection is currently underway.

36. Art, Music, and Work-Related Stress

Steven Smith Jr., Allison Boda, Sydney Carey, Ainsley Hilfiker, & Rebecca Bass, Muhlenberg College
Faculty Sponsor: Dr. Alexandra Frazer

Stress can be categorized as the feeling of being overwhelmed, worried or run-down. Stress can affect any age group and gender, and it can lead to severe health complications which

affect the immune system, cardiovascular system and the central nervous system (Baum 1990). On the other hand, there has been a significant amount of research done specifically on work-related stress in hospice care and several participants that reported that art therapy had a positive impact on their wellbeing and lessened their work-related stress (Huet 2017). And music therapy has been shown to help college students cope with stress (Jeon, Jeong, Lee, & Yim, 2016). However, there is still a gap in psychotherapy involving the effects on art and music therapy on stress in an academic setting. 40 Muhlenberg College undergraduates were put in one of four groups (music, art, art and music, and control). They were asked to fill out the Stress Rating Questionnaire (SRQ) (Edwards, Edwards, & Lyvers, 2015). They then completed the assigned relaxation task for their group. Upon finishing the relaxation tasks, the participants took the SRQ again, and did a stressful task, the concentration grid. After finishing the Concentration Grid, the participants answered some task related questions, and described their demographics. The purpose of this study was to examine how therapy through creative arts can reduce a student's stress level before completing a stressful task. Data collection is ongoing, and results and implications will be discussed.

37. Defining Wokeness and Allyship to Understand Prejudice and Egalitarianism

Christel Chavez, Mackenzie Calvert, Bec Stargel, & Leslie Villaverde, Lafayette College
Faculty Sponsor: Dr. Angela Bell

“Woke” and “Ally” are qualifiers for identifying people who acknowledge and understand concepts related to systemic inequality (e.g., #staywoke re: institutional racism, police brutality) or commit to supporting relationships with marginalized groups (e.g., straight allies for the LGBTQIA+ community). Given the lack of empirical evidence on how people perceive these qualifiers, the purpose of this study was to conduct content analysis and data coding to quantify themes in lay conceptions of “wokeness” and “allyship” to understand how they are related to prejudiced expressions and egalitarian (i.e., non-prejudiced) principles. Participants (n = 129) were asked to describe characteristics, attributions, and behaviors of those who are woke, an ally, or simply non-prejudiced. A total of 79.8% (n = 103/129) of participants indicated awareness about wokeness and 72.8% (n = 94/129) knew of allyship. Diverging themes emerged in categorical coding. Wokeness was often described as something one possesses (e.g., educated) whereas allyship was described as something one does (e.g., standing up for others). Allyship was described more positively than wokeness and not typically used within the context of race-based prejudice. Wokeness was associated with left-leaning politics, social media use, and generation-specific to Millennials. Authenticity of non-prejudiced people was also evaluated. Responses revealed that perceptions of wokeness and allyship are related but distinct, and attitudes and behaviors framed within the context of wokeness may not be aspirational. Moreover, wokeness could be appropriated to prove oneself as egalitarian. These lay conceptions have important implications for those who identify as woke or an ally.

38. Sex and Athleticism: Exploring Gender Stereotypes through Priming

Amy Trout, Erin Adolt, Sarah DeFranco, & Shaun Pateman, Moravian College
Faculty Sponsor: Dr. Sarah Johnson

Recent media coverage of the 2016 Rio Olympics has put the unequal coverage of female and male athletes into the spotlight. Sociological research exploring sports media coverage (e.g., Vincent, 2004; Petca et al., 2013) has come to the unsettling conclusion that female athletes are portrayed in a sexual light more than an athletic one, whereas the opposite is true for male athletes. Psychological studies looking at roles and traits provide validation to the idea of gender stereotype priming, i.e., that gender can lead to activation of thoughts about specific traits and vice versa (e.g., Blair & Banaji, White et al., 2009). Recently, Todd et al. (2016) used picture

primes and targets to suggest stereotypic associations related to race. This research has opened up greater possibilities for exploring more nuanced stereotypes, ones that are less easily captured with words, in relation to race and also gender. The current study explored stereotyped gender associations through picture-word priming, as in Todd et al. (2016). Women and men were shown picture primes (male and female athletes and non-athletes) and word targets (neutral, sexual, or athletic). We analyzed accuracy and reaction time for making a sexual/non-sexual target decision. Significant interactions revealed gender differences in processing words based on the prime characteristics. In particular, the gender of the prime impacted women when processing sexual words, whereas it impacted men when processing athletic words. Our results suggest that priming can reveal stereotyped associations between gender, athleticism, and sex.

39. Music and Underdogs

Ilissa Kaufman & Yunshan Jiang, Muhlenberg College
Faculty Sponsor: Dr. Kenneth Michniewicz

Previous research suggests that most people associate themselves with being an underdog, however in reality, most people are not. Viewed as heroes and inspirations, underdogs are disadvantaged people who face privileged opponents and are unlikely to succeed. The people who are privileged are known as top dogs (Goldschmied, Michniewicz, & Vandello 2012). The characteristics of an underdog are held highly in American society and contribute to why most people view themselves as one. Through research, we previously confirmed that certain music genres tend to be associated with different socioeconomic statuses and production motives. Specifically, producing classical and pop music are associated with high socioeconomic status, while blues and rap are associated with low socioeconomic status. In that research, it was found that underdogs were expected to produce music because they have a passion for it and the top dogs do it for economic gain. It was also viewed negatively when top dogs produced music that was associated with the underdog but not vice versa. Because previous research has associated top dogs and underdogs with different musical genres (Rentfrow & Gosling, 2003), and because people have a mental schema of what an underdog is (Goldschmied, Michniewicz, et al. 2012), the current study seeks to explore the consequences of underdog and top dog musical listeners when they are paired with specific genres of music, especially genres which do not match their topdog/underdog status. We plan to gather this data through an online survey and present our findings at the conference.

40. Effect of Ratings on Trans Individuals As Function of Underdog Status

Suzanne Brier, Muhlenberg College
Faculty Sponsor: Dr. Kenneth Michniewicz

Transgender people remain victims of prejudice and discrimination. In the current exploratory study, we investigated whether or not portraying a trans person as an "underdog" (disadvantaged in regard to wealth, family support, and opportunity), as opposed to a "topdog" (advantaged), would influence evaluations of that individual and of transgender people more globally. Because people generally support and feel warmth towards underdogs, we reasoned that a transgender person perceived to be an underdog would elicit more positive evaluations. Participants read about a college student named Alex who came from a relatively underprivileged background or a relatively privileged background. We assessed participants' feelings of warmth, competence, perceptions of underdog status, and likeability. Participants later learned Alex was transgender; we assessed likeability relative to the first evaluation. We finally asked participants to provide evaluations on measures of social dominance orientation, system justification, transgender rights and policies, and gender essentialism. We found mixed

support for our predictions: Learning that Alex was an underdog elicited greater evaluations of warmth and likeability (not competence). After learning that Alex was transgender, likeability did not differ between underdog and topdog conditions. Within the underdog condition, evaluations of Alex as an underdog predicted greater global support for transgender rights but not for related social attitudes. In the topdog condition, evaluations of the transgender person did not predict global support for transgender rights. Underdog status can be used to indirectly benefit transgender individuals and the group as a whole. This research can inform reduction of stigma towards many social groups.

41. The Role of Gender in Evaluations of Asexual Men and Women

Sarah Geisler & Elizabeth Vlattas, Muhlenberg College

Faculty Sponsor: Dr. Kenneth Michniewicz

Asexuality is a sexual orientation that is understudied in sexuality research. Recent research suggests that the magnitude of bias on interpersonal evaluations either meets or exceeds the bias experienced by other sexual minorities (MacInnis & Hodson, 2012). However, no research has systematically examined whether or not this bias depends on the gender identity of the group being evaluated, particularly in comparison to other sexual minorities. Given the centrality of sexuality in general, and heterosexuality in particular, to the male gender role, we explored whether or not asexual men (compared to women) received more negative evaluations and whether or not men (compared to women) found the hypothetical prospect of being asexual more aversive. Study 1 examined perceptions of social groups as a function of their gender (male and female) and sexual orientation (heterosexual, homosexual, bisexual, or asexual). Participants evaluated each group on personality traits and measures of dehumanization. Asexual people received more negative evaluations on average, but asexual men received significantly more negative evaluations than asexual women. In Study 2, we further explored this by having participants imagine either a hypothetical asexual person (male or female) or themselves as asexual. We found that men were more bothered by the prospect of being asexual than women were, and men evaluated female asexuals as being more feminine and less distressed than women did. Participants generally evaluated male asexuals as being less masculine, more distressed, and more likely to have mental health issues. We discuss these implications in light of prevalent gender role norms.

42. Pawception: Influence of Dog Breed on Expected Masculinity and Femininity Judgments from Others

Thea Doolittle & Tongyao Su, Muhlenberg College

Faculty Sponsor: Dr. Kenneth Michniewicz

Men and women experience social repercussions for violating gender role norms. As a result, people, though men in particular, feel uncomfortable when paired with something inconsistent with their own gender identity. Given that people make gender associations with different dog breeds (Budge et al., 2007), we examined the evaluations from others as a result of being paired with either a masculine or feminine dog breed. In Study 1, participants imagined a scenario in which a photograph of them with either a masculine or feminine dog circulated social media and were asked to rate how they expected to be perceived by others on traits stereotypically descriptive of their own gender. Results supported our hypothesis; when people, especially men, are paired with a dog consistent with their gender identity, they expected to be perceived as more gender typical than when paired with a dog inconsistent with their gender identity. In Study 2, we replicated Study 1; however, to emphasize the overlap of the self with the particular dog, we asked participants to imagine that the masculine or feminine dog

represented them on as an avatar for an interactive online game. Results again suggested that people, especially men, expected to be seen as having traits corresponding with the masculinity or femininity of the dog breed. Particularly, men felt discomfort when paired with a feminine dog and expected others to evaluate them less competently in the online game. Women did not show analogous findings for either measure when paired with a masculine dog.

Afternoon Paper Session: 2:30pm-3:30pm
Lehigh Valley Society for Neuroscience
Oechsle 224

Performance and Perspective: The Effectiveness of Visual Attention on a Website
2:30-2:45pm

Kathryn Ambroze & Travis Edmond, Muhlenberg College
Faculty Sponsor: Dr. Alexandra Frazer

The primary goal of the study is to examine how attention varies based upon presentation of different stimuli. The neural circuits of attention are being analyzed in interdisciplinary fields like neuromarketing through specific behavioral tools and techniques to gain an understanding of the consumer response to a stimulus. Research has shown that when looking at different visual tasks employing non-emotional stimuli, we see that distractors based in the parvocellular visual systems (color changes) are not capable of automatically capturing attention. However, visual stimuli based in the magnocellular system (movement, sudden onset) will attract attention in an automatic manner. The difference between these systems also lies in emotional stimuli, such that dynamic negative distractors capture attention to a greater extent than static emotional stimuli (Hahn, 2017). In the present study, multiple websites (Muhlenberg College, Bates College, Franklin and Marshall College, and Lafayette College) will be paired with eye-tracking software so the visual attention of each website may be studied. Participants will also be given a survey to analyze their emotional responses towards each website. Using the data from eye movements (heat maps, fixation points, timestamps) of each participant as well as survey responses, we will aim to answer the question do visuals or images on a website (1) draw the attention of a user and (2) add to the overall positive/negative feelings of a website? Does imagery hinder the ability to complete a task (i.e. Apply Now)? Data is currently being collected and results/conclusions will be presented at the conference.

Development of a Wireless, Hybrid Brain-Computer Interface for Wheelchair
Control
2:45-3:00pm

McKenna Schimmel, Ashley Goreshnik, & Brandon Smith, Lafayette College
Faculty Sponsors: Dr. Lisa Gabel and Dr. Yih-Choung Yu

For many with severe motor impairments and disabilities, regaining a sense of independence is paramount. Brain-Computer Interfaces (BCIs) provide this through alternate means of motor control and communication. Specifically, BCIs use neural signals to bypass the peripheral nervous system and control external devices. Through a neuro-feedback loop, users can learn to effectively modulate their neural activity to control specific aspects of computerized paradigms. Common BCIs include cursors and spellers. Using EEG for signal acquisition allows for high temporal resolution while remaining cost effective, non-invasive, and realistic for every day use. The present study utilizes a hybrid BCI device including a wireless EEG headset with a gyroscope function. It has been designed to control a ground-based device from a host computer, and has been implemented with both a small robot and a full-sized wheelchair. The ability of participants (n=20) to navigate an obstacle course modeled after ADA specifications was examined. Additionally, improvement in performance with repeated training over a two-day procedure was analyzed. After training measures, participants were asked to navigate the robot through the real-world styled obstacle course. Results demonstrate that participants perform as

well on the first day of testing as they do on the second day of testing, which occurred at least 24 hours later. All participants successfully navigated the obstacle course after training. With high success rates and short training times, this BCI device shows great promise for many applications.

Co-occurrence of Spatial Neglect and Functional Disability with Moderate to Severe Awareness Deficits

3:00-3:15pm

Stephanie Waldman & Peii Chen, Lafayette College & Kessler Foundation

Faculty Sponsor: Dr. Meghan Caulfield

Commonly occurring after unilateral brain injury such as stroke, spatial neglect is characterized by a failure or slowness to respond, orient, or initiate action towards the side of space contralateral to the brain lesion. Spatial neglect often co-occurs with awareness deficits, demonstrated as under-reporting one's own cognitive or motor impairment. Awareness deficits in conjunction with spatial neglect can have profound consequences for rehabilitation progress in regaining functional independence. We examined this hypothesis in 58 individuals with left-sided neglect after right brain stroke, using a secondary data analysis method. In this cohort (46.5% female; mean age=67.3 years, SD=13.3), severity of spatial neglect was determined with the Behavioral Inattention Test. Awareness of deficits was operationally defined as the over-estimation of one's own abilities in daily activities self-rated on the Barthel Index (BI), in comparison to caregiver rated BI. Using discrepancies between the two ratings (i.e., unawareness index), two groups were created for comparative analysis: no/mild unawareness and moderate/severe unawareness. Between-group comparisons revealed significant differences in spatial neglect severity, $t(56) = 2.19$, $p = .033$, and for functional independence at rehabilitation discharge, $t(52) = 3.06$, $p = .003$, suggesting poor self-awareness is associated with both spatial neglect and disability. Lesion analysis revealed that lesion size is not responsible for observed between-group differences, $p < .05$. However, between-groups lesion subtractions indicate similar underlying neural mechanisms are responsible for both spatial neglect and awareness deficits (i.e. right superior temporal gyrus and right superior longitudinal fasciculus) and may play a key role in regaining functional improvement after stroke.

The Role of Paternal Song Quality in Developmental Acquisition of Zebra Finch Song and Song Preferences

3:15-3:30pm

Taylor Corsi, Lafayette College

Faculty Sponsor: Dr. Michelle Tomaszycki

Vocalization in songbirds has shown to be a key mechanism in the formation and continuation of social relationships. However, little is known about specific elements of song females prefer and the mechanisms through which females develop such preferences. Most research to date has focused on male song, or has examined female choice through experimental manipulation of male song. This study, the first of its kind, experimentally manipulated paternal song to explore the influence of tutors on the development of male offspring song and female offspring song preference. This study tested the hypothesis that altered paternal song quality would affect the song quality of male offspring and would influence song preference and mate choice in female offspring. Paternal song was altered using a minor, reversible nerve transection technique. Female choice was measured using a two-choice preference test and a pair bond formation experiment. These results will contribute to our understanding of how song and song preferences are developed.

Afternoon Paper Session: 2:30pm-3:30pm
Social Psychology
Oechsle 223

Stereotype Implications of Feminist Self-Identification and Collective Action

2:30-2:45pm

Meghan Gregory, Cedar Crest College

Faculty Sponsor: Dr. Kerrie Baker

Stereotypes are prevalent in our society, and they hold the power to influence an individual's perceptions and opinions of others. The current study sought to examine if feminist stereotypes would influence one's self-identification and collective action. The study looked at three specific areas: feminist self-identification, collective action, and perception of the term "feminist" relative to a female image. Undergraduate students (N=116) from a private women's liberal arts college voluntarily participated in this study. The participants completed three questionnaires and viewed an image of a woman. It was expected that the positive stereotype condition would influence the participant's feminist self-identification and collective action. The ANOVA results showed that stereotype condition had no influence on feminist self-identification or collective action. The image labeled "feminist" was also expected to be rated more positively by participants in the positive stereotype condition, but it was not. According to the results, 61.2% of the participants in the study consider themselves to be feminist, while only 31% of participants consider themselves to be activists. There was a strong positive correlation between participants who consider their mother or stepmother to be a feminist and the participant's self-reporting as a feminist ($r = .66$). There was also a moderate positive correlation with participants that reported having taken a course that emphasized women's issues and their opinion of whether attending a women's college has influenced their feminist views, ($r = .386$). While the study did not yield any main effects, several interesting correlations were present.

Examining Race and Gender Prejudice: Intersecting Identities

2:45-3:00pm

Melinda Troyka, Muhlenberg College

Faculty Sponsor: Dr. Connie Wolfe

Much of the existing research on gender and racial prejudice is limited in the way that it does not always account for the unique experiences that occur when someone identifies with multiple oppressed groups. This study seeks to look at the way that different forms of subtle prejudices, such as colorblind racism and benevolent sexism, interact to create a unique form of discrimination experienced by black women. We examined this interaction by showing participants either a black or white female job applicant who was either high or low in femininity, and asked them to hire her through an affirmative action policy. We expected people's reactions to being asked to hire this woman to vary based on their levels of color-blind racism and benevolent sexism as well as the specific woman's intersecting identities.

How Means- and Ends-Focused Groups Differ in Accepting Non-Prototypic Members' Ideas

3:00-3:15pm

Yung Ching Yang, Lehigh University

Faculty Sponsor: Dr. Dominic Packer

Past research has addressed how ingroup divergence and innovation is evaluated, finding that non-prototypic group members (e.g., newcomers, minorities) are evaluated less positively when they offer divergent ideas. We investigated how a group-level characteristic affected the degree to which a group is means- vs. ends-focused affects members' acceptance of non-prototypic member's ideas. We hypothesized that participants in a means-focused group would evaluate ideas more positively when they came from prototypic vs. non-prototypic members, whereas participants in an ends-focused group would have more positive evaluations of good ideas regardless of their source. In a large sample scenario study (800+ respondents), participants imagined themselves working in a start-up tech company in which the majority of the employees are young. After reading the description of the company (means/ends-focused), participants were presented with the information of a team member (prototypic/non-prototypic) who provides an idea (strong/weak) in a meeting, and they were then asked to evaluate the member's idea. Results of the study did not find evidence consistent with the hypothesis. However, a main effect of idea strength was observed that the participants who read stronger idea tended to give higher evaluation to the idea. Also, participants did expect to identify more strongly with groups they perceived as ends- rather than means-focused, an effect that we have replicated and that likely has important implications for group functioning.

Perception of Natural Hair and How It Affects Black Women Self-Esteem

3:15-3:30pm

Sabrina Severe, Eastern University

Faculty Sponsor: Dr. Douglas Trimble

The western standard of beauty has negatively plagued women until this day. This glorified version of beauty has affected Black women but more specifically their outlook on their hair. For my study I have collected 123 women survey between the ages of 18-44. This is a mixed method research; the first portion is open to all races but my second portion will only be open to Black women. This will be done through a Google form. There will be 3 parts to the Google survey. The first part contains the Self-liking and Self-Competence scale, then the participants have to rate pictures of different women (varying by skin color and hair styles) on an attractiveness scale. After, the participants took the Rosenberg Self- Esteem to see if their self-esteem was affected by the photos. Then there will be an ethnicity question all the other races will be taken to submit their answer while the African-American or Black women will be taken to 5 questions that can provide further insight to me to dive deeper the issue of hair and self-esteem. In the future I hope this will give notice to a silent voice. A voice that have always meant to choose and never have their own platform. I have found through my research that Black women with curly hair were considered more attractive rather than white women with straight hair and their self-esteem was not affected by the pictures.