Proceedings of the

30th Annual Lehigh Valley Undergraduate Psychology Conference

And

6th Annual Lehigh Valley Society for Neuroscience Chapter Undergraduate Research Conference

Lehigh University
Rauch Business Center

April 25, 2015
8:15 – 4:30

Participating Colleges and Universities

Bloomsburg University of Pennsylvania
Cedar Crest College
De Sales University
Lafayette College
Lehigh University
Medical School of Temple University/
St. Luke’s University Health Network
Moravian College
Muhlenberg College
The College of New Jersey
Ursinus College

Sponsors

Society for Neuroscience
Lehigh Valley Association of Independent Colleges
Lehigh University Departments of Psychology and Biological Sciences
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Keynote Address

The Vulcanization of the Human Brain: A Neural (and Evolutionary) Perspective on “Cognition-Emotion” Interactions in Decision Making

Dr. Jonathan Cohen
Princeton University

Behavioral economics has catalogued a large number of circumstances in which human decision making seems to deviate from optimality, as this is defined by the standard economic model. A related puzzle pertains to aspects of human moral decision making behavior, where people exhibit inconsistencies in their selective application of utilitarian principles. A variety of accounts have been offered for these apparent “irrationalities” in human decision making behavior, but as yet there is no systematic understanding of their basis. In this presentation, I will describe behavioral and neuroimaging results of studies suggesting that: a) we can measure the neural correlates of economic and moral decision making behavior; b) in the cases studied, these neural correlates are systematically related to the behavioral outcome of the decision making process; and c) for both types of decisions, the outcome seems to be determined by a competition between “cognitive” and “emotional” processes. Based on these findings, I will freely (and shamelessly) speculate about the evolutionary origin of these emotional responses, the ways in which they have been rendered maladaptive under some circumstances by the continued evolution of the human brain and its influence on social structure and technology, and how these developments might explain the apparent “irrationality” of human decision making behavior.

Dr. Jonathan Cohen is the Robert Bendheim and Lynn Bendheim Thoman Professor of Neuroscience and Professor of Psychology at Princeton University. Dr. Cohen has academic ties throughout Pennsylvania having received his M.D. from the University of Pennsylvania and his Ph.D. in cognitive psychology from Carnegie Mellon University, where he also served as a faculty member until 1998 when he moved to Princeton. At Princeton he has served as Founding Director for the Center for the Study of Brain, Mind and Behavior and for the Princeton Neuroscience Institute. Dr. Cohen’s expansive research agenda addresses processes of cognitive control (i.e. the ability to guide attention, thought and action in accord with goals or intentions) from multiple levels of analysis including neurophysiology, systems neuroscience, and cognitive psychology.
We explored how describing category membership as always possessed versus recently acquired influences people’s beliefs about health categories. Participants read a description of a person experiencing symptoms of a novel mental health disorder. We manipulated how the disorder was described as being attained: the person was born with the disorder, the individual had a genetic predisposition for the disorder, the individual had recently acquired the disorder, and a control condition with no category attainment information. We measured participants’ beliefs about causes of the disorder, whether the disorder possessed a causal essence that all members of the disorder shared, stigmatization of the disorder, and ways to treat the disorder. Participants differentiated across conditions what causes they thought to be most likely for the disorder, suggesting that manipulating how long category membership has been possessed influences beliefs about the underlying etiology of the disorder. No other beliefs differed by our condition manipulation.

People have a drive to understand the world around them, especially the behavior of other people. For example, media outlets try to explain abnormal behaviors through mental disorder labels, such as citing depression as the source of a person’s actions. Previous research has shown that creating a good, plausible explanation for a set of behaviors makes those behaviors appear more normal (Ahn, Novick, & Kim, 2003). We explored whether a mental disorder label functions as a plausible causal explanation of behavior and how such an explanation influences laypeople’s perceptions of how normal or abnormal those behaviors might seem. Participants read descriptions of fictional characters displaying disordered behaviors. Each set of behaviors was described as originating from a life event, a mental disorder label, or no such cause information was provided. Participants rated behaviors explained through a mental disorder diagnosis as more abnormal than when no such explanation was provided or when a life event explanation was provided. These results were not because people with mental disorders were blamed more for their behaviors or because participants thought those with a mental illness had more control of their behaviors or their illness.
9:00-9:15 The Effect of Social Media Use on Self-Esteem
Allie Scirrotto, Jessica Mullelly, Lauren A. Lex, Kaitlin M. Goy, and Sarah E. Miller
*DeSales University*, Faculty Adviser: Dr. Sarah Starling

Previous research has indicated a strong negative correlation between social media use and self-esteem among adolescents. The current study examined whether that link is present and significant among college-age individuals. Thirty college students completed the Rosenberg Self-Esteem Scale to evaluate their overall self-worth. Next, they were asked to spend ten minutes either coloring or using their preferred form of social media. They then completed a variation of the Rosenberg Self-Esteem Scale (from which a post/pre test difference score was calculated) and a questionnaire about social media usage. Surprisingly, there was no significant correlation between the pretest and questionnaire nor any significant difference in difference scores between groups. Future studies might involve an increase in allotted time for the activity portion and more control over social media use during the experiment.

9:15-9:30 Exploring Cell Phone Addiction and its Effects on College Students’ Anxiety and Productivity
Chelsea M. Cutino
*Lafayette College*, Faculty Adviser: Dr. Michael Nees

The goal of the study was to explore cell phone addiction among college students and how this might impair academic productivity. Participants worked on their own class materials for 60 minutes. The main manipulation consisted of either restricting or allowing participants access to their cell phones while studying. Change in anxiety from before to after the study session was determined through two administrations of a self-report anxiety survey, and productivity was measured through a self-report estimate after the study session. I predict that those without cell phone access who classify as heavy cell phone users will show the greatest increases in anxiety over the hour as well as the greatest deficits in productivity as compared to all other participants. While cell phone use may have directly distracting effects in academic settings, this study could show how addictive symptoms could exacerbate the problem when access is limited.

9:30-9:45 The Effects of Cellphone Dependency on Body Physiology
Kiana L. Ashby, Olivia C. Gordon, Escarlin M. Alvarez-Jimenez, Margaux M. Morris and Leslie Myers
*DeSales University*, Faculty Adviser: Dr. Boyce Jublian

Cellphones have provided us with the convenience to maintain communication in a variety of ways. When cellphones are inaccessible, some people may experience emotional distress. College students were examined to analyze the effects of denied cellphone access on physiology. Both men (n=11) and women (n=13) participants were given a reading test and asked to complete as many questions as possible within five minutes. Participants were also asked to make their cellphones visible, but prevented from using it during the time they completed the test. During two different time intervals, their cellphone rang and physiological data (heart rate, systolic, and diastolic blood pressure) were measured. Results show that there was a significant increase in all of these physiological measures when participants were not allowed to answer their cellphones during testing (p<.05). These results suggest that cell phone dependency has an impact on body physiology.

9:45-10:00 Effects of Mobile Application Study Method on Memory Retention
Rebeca A. Cabrera, Melissa J. Faller, Matthew J. Lynn, and Kimberly D. Bell
*DeSales University*, Faculty Adviser: Dr. Boyce Jublian

The use of flashcards is a popular study method for students when preparing for exams. In this study, three study methods (Method 1: reading without flashcards; Method 2: paper flashcards, and Method 3: flashcard mobile application) were examined to determine their effects on memory retention in college students. Twenty college students (12 women, 8 men) participated in this study, ranging in class year from freshmen to senior of various majors. The participants were tested in each method using 20 SAT vocabulary words followed by a 20 question matching quiz. Test results show high averages using these methods: Method 1 = 19.25; Method 2 = 19.35; Method 3 = 19.00. Single-Factor Within Subject ANOVA did not show a significant difference between the three methods (p>.05). Incidentally, the year level proved to be significant when using the flashcard mobile application, where the freshmen had the highest mean scores (p=.04).
Our moods and the facial expressions we see affect our perceptions and are important for understanding interpersonal relationships. Forty one undergraduate students at Cedar Crest College were primed to feel happy or frustrated using a puzzle. They then rated subliminally presented faces for emotional expression on a 7-point Likert scale (1=Very Happy; 7=Very Frustrated). Response times were also recorded to determine which facial expression was responded to the fastest. It was hypothesized that induced frustration or happiness would lead to faster reaction times and mood congruent ratings for subliminally presented neutral and emotionally ambiguous faces. There was no significant effect of mood on either emotional expression ratings or response times. This meant that the mood manipulation did not work and therefore their mood did not affect their perception. Also, emotions were not recognized quicker than another. The results will be further discussed.

Previous studies have demonstrated the effects of emotion priming on expression recognition but neglected to investigate the nature of the errors made when attempting to recognize the neutral expression. The prediction, in this study, was that emotional projection would occur when participants attempted to categorize neutral faces. Forty-nine undergraduates were primed with emotionally charged words, then were exposed to images of faces. Participants chose the emotion of the face from a list. If the responses to neutral faces matched the primed emotion, emotional projection occurred. Physiological measures reflected no difference between the experimental and the control groups suggesting no difference in affect, therefore emotional projection did not occur. Unattended information in the environment does not have an effect on our abilities to recognize the facial expressions of others. A replication with stronger priming stimuli is needed.

Previous research has suggested that rumination has two primary goals: understanding the situation and resolving that situation. The aim of the current study is to discover if different kinds of social support can prevent understanding-focused and resolution-focused rumination. Participants received negative feedback on a personally relevant task and were then given different forms of social support. There were five social support conditions: cognitive reappraisal, emotion suppression, understanding-focused informational, resolution-focused informational, and a control. These encouraged the participant to re-imagine the stressful event in a constructive way, or hide one’s emotional reactions, gave them the tools to understand the task better or focus on something else, or gave no support at all, respectively. We then measured post-task rumination through various measures. We hypothesized that the understanding-focused support and reappraisal support will prevent rumination more effectively in understanding-focused ruminators, while resolution-focused support and suppression support will prevent rumination more in resolution-focused ruminators.

During the preschool years, children gain the ability to resist immediate rewards for distant salient rewards as they learn the difference between effective and ineffective delay strategies. Children also develop tendencies to experience guilt, associated with positive outcomes, or shame, associated with negative outcomes. Since emotion-regulation and, more generally, self-regulation are highly correlated, we hope to show this correlation can be applied to moral emotions and impulse control. 50 preschoolers were exposed to a delay of gratification task to assess self-regulation and control, and a mishap task to assess guilt-and shame-proneness. We predict those who are able to delay gratification longer will engage in more effective delay strategies and guilt-prone behaviors. Alternately, those who are unable to delay gratification will engage in more ineffective delay strategies and shame-prone behaviors. Findings may suggest strengthening self-control can be an effective prevention strategy for children at risk for developing moral conduct issues.
In a situation where gender threat is present, the performance of women may suffer. This study investigates the effect of gender threat on women when using technology. Ten college-aged women were asked to play the video game, Mario Kart. The participants played during three trials: Trial 1: presence of a male opponent, Trial 2: presence of a female opponent, and Trial 3: playing alone. After each trial, the participant’s race time, Gender Sensitivity, and Self-Esteem scores were measured. We used their race time and survey scores, to evaluate the existence of gender threat. The results showed that gender threat did not have a significant effect on the race time, Gender Sensitivity, and Self-Esteem scores (p>.05). However, the mean race time score was longer when they were playing against a male. Gender threat may not be effective when playing a seemingly gender-neutral game.

The present study examined the effects of candidate gender and qualifications on mock hiring decisions. A sample of 65 female undergraduates read a job description for a stereotypically male position (Financial Analyst), and evaluated one of four profiles (cover letter and resume) varying in terms of gender and qualifications (qualified vs. overqualified). Participants evaluated the candidate in terms of skills, experience, and suitability for position, and then indicated their likelihood of hiring the candidate. A significant interaction was predicted on participant’s ratings. While there was no significant interaction, participants were more likely to indicate willingness to hire the overqualified candidate, if there were no other suitable candidates who applied (i.e., qualifications main effect on single questionnaire item). Additionally, hiring decisions and ratings of candidate suitability did not correlate with scores on the Ambivalent Sexism Inventory (ASI; Glick & Fiske, 1996). The implications of these results will be discussed.

This investigation builds upon our previous focus group study in which researchers found that women of color shared similar experiences related to microaggressions, defined as “brief, everyday exchanges that send denigrating messages” (Sue et al., 2007). Indeed, based on the findings, we proposed the existence of a systemic form of “microaggression” called “macroinvalidation.” Furthermore, we identified this systemic form of “signaling” as a reinforcing factor in the pervasiveness of microaggressions. The present study further examined the nature of microaggressions experienced by a small group of self-identified women of color in a small liberal arts college environment. Using qualitative data gathered through tape-recorded individual interviews with ten women, researchers investigated themes relating to microaggressions. Preliminary evidence suggests that, especially given their perceptions of limited supports in a macro-invalidating context, these women report feeling excluded from the larger community, and perceived this as negatively impacting their well-being.

Lakens and Stel (2011) found that when individuals move in synchronous motion, as opposed to asynchronous motion, there is an increase in perceived group entitativity and rapport. We investigated how synchronous movement and the presence of music would influence a group’s rapport and entitativity. Participants were asked to watch a video of three women walking synchronously or asynchronously coupled with positively-valenced music, negatively-valenced music, or no music. We predicted that exposure to positively-valenced music would result in a stronger degree of rapport and group entitativity than the negative and no music condition. Furthermore, we predicted that the group with the strongest degree of rapport and group entitativity would be the synchronous movement condition, and that the group with the weakest degree of rapport and group entitativity would be the asynchronous movement condition.
The Words are Yet to Come: Sustained Attention in Preparation of Phonological Fragments in Word Production
Sarah Trapp
Lehigh University, Faculty Adviser: Dr. Padraig O'Seaghdha

Although speaking a word that has already been retrieved may be largely automatic, we are conscious of the properties of words and can direct attention to them. This enables us to prepare in advance if we know what the first sounds of words will be. The purpose of this study is to look at fundamental aspects of sustained attention to such phonological fragments. The first of two experiments will examine how we prepare when some items are inconsistent with the preparation: If there are several exception items, can attention still be directed to a property shared by several other items? The second experiment looks at how sustained attention is directed to two equal groups (e.g., bath, beach, boot and pear, pot, pig). In addition to exploring the flexibility of phonological attention, this research points to a distinction between attentional and phonological syndromes in speech disorders.

The Effect of Social Media Multitasking on Reading Comprehension
Natalie Evans
Muhlenberg College, Faculty Adviser: Dr. Laura Edelman

As the ubiquity and accessibility of social media has increased, so too have the concerns and questions about how it is impacting its users. Prior research has indicated that college students often engage in multitasking with social media while studying. The goal of the current study is to examine how social media multitasking may impact performance on a reading comprehension task. In the study, participants were asked to read an article, and some were asked to multitask while reading. Participants in the multitasking conditions saw pop ups that either contain simulated social media posts to read or simulated instant messaging questions to answer. After reading the article, all participants took a reading comprehension measure based on what they had read. I hypothesize that participants in the multitasking conditions should perform worse on the reading comprehension measure than participants who just read the article without multitasking.

The Role of Scramble Type and Context on Reading Scrambled Words
Kelsey A. Snyder
DeSales University, Faculty Adviser: Dr. Sarah Starling

When asked to read a scrambled word we may rely on both the individual letters in the word and also the context that the word is in. In this way, we may rely on both orthographic and contextual information. In a pilot study, 50 undergraduate students were tested on their ability to recognize two scrambled words in sentences when the type of word scramble (whether or not the first letters were held constant) and the word order in the sentence (words were in order or scrambled) were manipulated. The previous study found that most errors in unscrambling the target words occurred when word order was scrambled (p < .0005). The current on-going study addresses some limitation of the previous work (such as unmatched word frequencies) and explores whether the type of word scramble and sentence order have an effect on both the speed and accuracy of participants responses.

Memory in Films
Megan Costanzo, Joshua Guntz, Donnajoe Olmo, and Amy Yusella
DeSales University, Faculty Adviser: Dr. Sarah Starling

A person reading subtitles can miss important visual and/or auditory qualities of a movie that are not spoken. This study investigated whether participants watching a movie without subtitles would have a better grasp of the movie’s content than those who watched with subtitles. The film "Can't Put Down the Oreos?" was shown to 38 participants in 3 groups: with sound and no subtitles, with sound and subtitles, or without sound but with subtitles. They were tested for their recall of both visual and auditory questions and completed an OSPAN Task, which measures Working Memory. Participants self-reported their perceived multitasking abilities. A One-Way ANOVA found no differences between the quiz score across the three groups. There was no significant correlation between the quiz performance and the participants’ self-reported ability to multi-task. There was, however, a significant difference in accuracy for audio-visual questions with the worst performance in the no sound with captions condition (p<.007).
Learning, memory, and creativity are skills that exhibit an enormous influence on and variety between different people. We aim to understand this inter-individual variation in cognitive ability by studying the lynx1 gene, an inhibitory modulator of the cholinergic system. Lynx1 binds to nicotinic acetylcholine receptors and suppresses their activity, thereby acting as a molecular brake on processes such as learning and memory. We hypothesize that single nucleotide polymorphisms (SNPs) that alter the human lynx1 sequence may change lynx1’s interaction with its receptor and the cholinergic system, thereby also altering cognition, learning and creativity. We aim to study this hypothesis by conducting a large-scale, correlative analysis of lynx1 gene structure and performance on cognitive batteries in humans. Priority for analysis will be given to the mature protein and promoter sequences, with any detected SNPs being examined for downstream molecular and cognitive effects. A better understanding of how the lynx1 gene influences these cognitive processes could shed light on how the cholinergic system is modulated. This would help us understand not only learning, memory, and creativity, but also help us develop therapies for disorders associated with the cholinergic pathway including, but not limited to, Alzheimer's disease, dementias and addiction.

10:30-10:45 Exploring the Genetic Basis of Cognitive and Emotional Processing
Crystal Lovelace Katherine Iturralde, and Kristin R. Anderson
Lehigh University, Faculty Adviser: Dr. Julie M. Miwa

We are exploring the genetic basis of differences in cognitive traits between individuals, in the Lehigh University BIOS 297 class, Experimental Neuroscience Laboratory. The lynx2 gene is involved in anxiety and fear. Specifically, it is known that mice, in the absence of the lynx2 gene, show a big increase in levels of anxiety and fear. By detecting mutations (SNPs) in the same gene in humans, it is possible that we may find a particular sequence that is altogether “silent” and that may make them demonstrate the same levels of anxiety as the genetically engineered mice. Through the collection of DNA samples and sequencing to find the presence of SNPs, we may be able to find a correlation between anxiety levels and the lynx2 gene in humans.

We have analyzed two tests for anxiety, the STAI and STICSA questionnaires. According to Gros and colleagues, the STAI test alone is limited in that it measures both anxiety and depression, a factor we hoped to eliminate when analyzing our data (2007). On the other hand, the STICSA is a better representation of pure anxiety, specifically the cognitive and somatic characteristics of anxiety. We believe that administering both the State-Trait Anxiety Inventory and the State-Trait Inventory Cognitive Somatic Anxiety tests will provide us with a more accurate measure of anxiety levels. Differentiating between the two can help us gather a more subjective representation of anxiety and its association to the lynx2 gene.

10:45-11:00 Intranasal Administration of DNSP-11 in a Chronic 6-Hydroxydopamine Model of Parkinson’s Disease
Ghoweri, AO, and Fox, CM
Moravian College, Faculty Adviser: Dr. Cecilia M. Fox

This project examines the efficacy of DNSP-11, a biologically active synthetic peptide derived from the human pro-sequence of glial cell line-derived neurotrophic factor (GDNF), to offer protection of dopamine neurons against the neurotoxin 6-hydroxydopamine (6-OHDA) in a rat model of Parkinson’s disease. In past studies, treatment with GDNF has shown significant improvement of parkinsonian symptoms through dopaminergic neuroprotection. Despite this, the size of the protein prevents it from traversing the blood-brain barrier, thus limiting its application as a therapeutic. Circumventing this limitation, the smaller propeptide, DNSP-11, may offer a more feasible alternative. Intranasal injection of DNSP-11 was used as the mechanism of drug administration, investigating its practicality for clinical use.

This study compares motor function of the experimental group of twelve male Fischer344 rats receiving intranasal DNSP-11 to twelve control rats administered a saline solution intranasally. Two behavior tests, the foot-fault and cylinder tests, were conducted over the time span of eight weeks post-surgery. These tests are used to measure fine motor skills. Overall, there appears to be some behavior improvement in the animals treated with DNSP-11. Animals treated with DNSP-11 had significantly fewer missteps in the foot-fault test by 7 weeks post-lesion compared to the control group counterpart. These behavior results reflect a potential therapeutic application for this intranasal approach of a promising peptide for the treatment of Parkinson’s disease.
Cognitive Psychology: Perception and Memory  
RBC Room 261  
Chair: Matt Sabia

2:30-2:45 Adaptive Memory: Do Items Useful for Survival Have a Privileged Status in Memory?  
Emily S. Fastov  
Lehigh University, Faculty Adviser: Dr. Almut Hupbach

Memory serves the purpose of remembering aspects of the past that are needed in the present or future and is geared toward helping humans enhance their reproductive fitness. Research supports that memory systems are configured to preserve information related to survival; participants who process information in terms of how relevant it is for survival engage in higher levels of recall. Previously, the survival-information effect has only been demonstrated for information that can be characterized as survival threatening (e.g., injury, virus). The present study investigates the survival-information effect by examining memory for survival-beneficial items (such as water and seeds) versus survival-irrelevant objects (such as lipstick and envelope) after they have been processed in a survival scenario, moving scenario, or in terms of pleasantness. The study will evaluate memory through an explicit free recall task. I predict to find higher recall for survival essential objects compared to survival irrelevant objects across all three scenarios.

2:45-3:00 Individual Differences in Visual Perception  
John F. Pinto  
DeSales University, Faculty Advisers: Dr. Sarah J. Starling, Dr. Gregg Amore, and Dr. Boyce Jublian

A single blind, between subjects study on the effects of empathetic altruism on the change blindness principle in college students is in progress. Participants are given a change blindness task in which a stranger makes a small addition to their wardrobe while outside of the participant’s view. This occurs either during an opportunity to help the stranger (who drops an armful of books and papers), or while the stranger is otherwise temporarily out of view. Afterwards, the participant is questioned to determine whether they are aware of the change. Participants are also asked to self-rate their observational skills. We propose that even if the participant is actively engaged with the confederate during the altruistic act, the participant will be unlikely to notice the change. Data from preliminary subjects indicates the majority of participants in the experimental condition did not notice the change. Final results are pending completion of the study.

3:00-3:15 The Effect of Music on Visual Memory  
Brittney Gellentien, Alec J. Mozeko, John A. Nungesser, and Kevin P. Stang  
DeSales University, Faculty Adviser: Dr. Sarah Starling

College students often study while listening to music, in fact some music playing software comes with “Music Study Playlists” pre-installed. Given that music exposure is associated with a range of cognitive benefits, is background music actually helpful for learning? In a preliminary experiment, 30 college students took a visual memory test (3x3 grid of images) while in a silent room or while listening to a fast paced or a slow paced classical piece. After studying for 1.5 minutes they were tested on image location. Most participants received a perfect score, demonstrating a ceiling effect. We are currently in the process of rerunning the study, this time with more complicated stimuli and preliminary results show no ceiling effect. Based on previous findings that fast-tempo and upbeat music improves cognitive performance across a variety of tasks, our hypothesis is that the fast-paced classical condition will be the most beneficial for visual memory.

3:15-3:30 The Effects of Listening to Music on the Perception of Emotion in Human Faces  
Tiffani L Gebhardt  
Cedar Crest College, Faculty Adviser: Dr. Sharon Himmanen

The present study examined the effects of listening to music on perceptions of the facial expression emotion. A sample of 69 participants sat quietly during the presentation or absence of auditory stimuli, and rated the emotion and attractiveness of images of facial expressions ranging from extremely happy to extremely sad and extremely unattractive to extremely attractive. The auditory stimuli included happy-sounding music, sad-sounding music, white noise, and silence. Participants in the music conditions also rated the emotion of the music. It was hypothesized that the range of ratings of emotion of the facial expressions would shift towards happier ratings overall following a happy musical excerpt and more sad ratings overall following a sad musical excerpt, but music was not expected to affect perceptions of extreme emotions. There was no significant effect for auditory stimulus on rating of perceived emotion. The implications of these results will be discussed.
Evidence of PTSD-like symptoms has been observed in Holocaust survivors, their offspring, and into a third generation. Considering the Holocaust is an event exclusively part of Jewish history, the present study intends to determine if the Holocaust is a cultural trauma among the Jewish population as well as an epigenetic phenomenon. I believe that when reminded of the Holocaust exclusively (not other genocides), Jews will find Stanley Milgram’s “Obedience to Authority” Experiment 5 less ethical than non-Jews since it was conducive to a Holocaust-like situation. Results indicate that Jews and non-Jews did not between genocide conditions relative to Milgram’s study, but participants did significantly differ in their ratings of the study when broken down by religious identity. As a whole, atheists and agnostics found the study much more ethical than non-religious participants.

The current study examines the interrelationships among adult attachment, stress experience and reactivity, and wellbeing. One-hundred participants (77 females, age range: 18 to 22 years) were recruited from Lafayette College. Results showed that higher scores on the avoidance attachment dimension were correlated with greater stress experience and poorer psychological wellbeing. In addition, higher scores on the anxiety attachment dimension were correlated with greater stress experience and perceived stress reactivity. Perceived stress reactivity was correlated with poorer physical wellbeing, and greater stress experience was correlated with poorer psychological and physical wellbeing. Multiple regression analyses testing the mediation of the attachment-wellbeing link through stress experience and perceived stress reactivity showed that the relationship between avoidance and psychological wellbeing was partially mediated by stress experience. This finding indicates that higher scores on avoidance had a direct relationship to poorer psychological wellbeing along with an indirect relationship via the experience of higher stress levels.

The purpose of this study was to assess the influence of adult attachment orientation on decisions to conform or dissent to group norms, as these two fields of research have not previously been combined. We believe that decisions to dissent versus conform are related both to attachment style and the nature of the norm in question. For this study, subjects came into the lab and after completing several questionnaires received false feedback regarding the normativity of their stance on a particular norm among Lehigh students. They then engaged in a “interview” task with a confederate where they elaborated on their position and willingness to change. Our primary interest in the interview was indications of willingness to conform versus dissent during the interaction, as well as the change in their self-reported stance on the issue following the interaction.

Blame occurs when a perceiver responds with anger, dislike, and related negative feelings to a person who is perceived to have committed a normative violation. Literature suggests that excessive blaming can be detrimental to one’s social relationships as well as psychological and physical health. The present study investigates the relation between blame practices and relational and psychological outcomes in a tight-knit affinity group (i.e., a sorority). We measured the blame practices of specific individuals (targets) and analyzed how those practices shape targets’ peer relations and psychological adjustment at two time periods, separated by six weeks. Our main prediction was that relational quality at Time 2 would be predictable from blame practices at Time 1, specifically; more punitive blame practices at Time 1 will predict poorer relational quality at Time 2. Preliminary analyses of Time 1 data (Time 2 data are not complete) indicate some support for relations between both blame practices and psychological adjustment.
We compared the expected values from the simulations to the observed data in order to assess how well they can replicate fly behavior and what inferences we can make about the relationship between decisions made at different levels of the maze and the probability of turning. Additionally, we further explored single fly behavior in a maze and how it compared to the group trial data that was collected.

3:00-3:15 Using a Forced-Choice Maze Paradigm to Investigate Visual Attention in Musca domestica
Angela Grassi, Emin Eminof, Tim Carroll, and Patrick Williams
Muhlenberg College, Faculty Adviser: Dr. Patrick Williams

Visual attention shapes the way that we experience the world. When we attend to an object, we enhance our spatial resolution and contrast sensitivity for that object, influencing performance on visual tasks. While visual attention has been rigorously explored in humans at the behavioral level, its underlying physiological mechanisms are not well understood. For this reason, flies are a promising model for the study of attention because they are highly visual animals with brains that are easily accessible to neurophysiological recording. However, studies that have reported the existence of visual attention in flies have either not directly manipulated attention or have reported time scales that are unrealistically slow, leaving doubts about whether attention is behaviorally efficacious in flies. Our research is designed to study visual attention in Musca domestica on ethologically-relevant time scales. We use a forced-choice maze paradigm to assess performance on a task in which a cue potentially manipulates visual attention. However, unlike previous experiments where the location of the cue may have biased the fly towards the “correct” response, our cue does not. We report on the development of these experiments and intermediate progress on testing the attentional effects of a variety of cue durations and timings.

3:15-3:30 A Cost-Effective Comparison Between Transforaminal and Lateral Lumbar Interbody Fusions Using the Incremental Cost-Effectiveness Ratio at 2-Year Follow-up
Gurpreet Surinder Gandhoke, M.D., Han Moe Shin, Yue-Fang Change, Ph.D., Zachary J. Tempel, M.D., Peter C. Gerszten, M.D., David O. Okonkwo, M.D., Ph.D., Adam S. Kanter, M.D.
University of Pittsburgh, Faculty Adviser: Gurpreet Gandhoke, M.D.

Introduction: Both transforaminal lumbar interbody fusion (TLIF) and lateral lumbar interbody fusion (LLIF) are effective surgical interventions for appropriately selected patients with degenerative lumbar spondylosis. This study
sought to compare health care costs associated with these procedures by calculating the incremental cost-effectiveness ratio (ICER) and, thereby, the difference in the mean total cost per quality adjusted life year (QALY) gained for TLIF versus LLIF for the treatment of degenerative spondylosis. We further calculated the thresholds for Minimum Clinically Important Difference and Minimum Cost Effective Difference for patient-reported outcome measures at 2-year follow-up.

Methods: Forty-five patients who underwent single level TLIF and 29 patients who underwent single level stand-alone LLIF for degenerative spondylosis with low back and leg pain were included. All costs from diagnosis through 2-year postsurgical follow up were available from a comprehensive single center data bank within a unified hospital system. Total cost to the third-party payor for all spine-related medical resource use from the time of diagnosis through 2 years was recorded. QALYs were calculated from EQ5D collected in an unbiased manner by a non-clinical staff member. Difference in mean total cost per QALY gained for LLIF minus that for TLIF was assessed as the incremental cost-effectiveness ratio (ICER: Cost LLIF - Cost TLIF/QALY LLIF - QALY TLIF).

Results: Significant improvements were observed at 2 year follow up for both TLIF and LLIF utilizing SF36PCS, ODI, VASBP, VASLP and EQ5D. ICER calculations revealed similar mean cumulative QALYs gained at the 2-year interval (0.67 for TLIF and 0.60 for LLIF; p=0.331). Mean total cost of care following TLIF and LLIF were $53,038 and $55,464, respectively; (p=0.960). MCED thresholds with an anchor of <$50,000/QALY were higher than MCID thresholds (calculated using the Health Transition Index anchor) for all patient-reported outcome measures. Total mean cost and EQ5D were statistically equivalent between the 2 treatment groups.

Conclusions: Transforaminal lumbar interbody fusion (TLIF) and lateral lumbar interbody fusion (LLIF) produced equivalent 2-year patient outcomes at an equivalent cost effectiveness profile.
Poster Session
RBC Gallaria 1:30-2:30
Session Coordinators:
Dave Braun and Natasha Thalla

1 Testing the Reliability of the Autism-Spectrum Quotient over Time
Jennifer Jones, Jaclyn Lloyd, Alexandra Habecker, Jordan Miller and Dr. Jennifer L. Stevenson
Ursinus College, Faculty Adviser: Dr. Jennifer L. Stevenson

Autism Spectrum Disorder is characterized by atypical social communication and intensely detailed focus. The Autism-Spectrum Quotient (AQ) is 50 questions that quantifies the number of autistic traits. This study investigated the reliability of the AQ in a neurotypical sample. In the first session, 63 undergraduates (49 female, 14 male; M age = 18.95 years, SD = 0.97) completed the AQ and a demographic survey. In the second session, approximately 2 weeks later, 38 undergraduates (29 female, 9 male; M age = 19.08 years, SD = 1.05) completed the AQ and the Marlowe-Crowne Social Desirability Scale (SDS). Neither total AQ score (t(37) = 0.465, p = .645) nor subscale scores (F(4,148) = .916, p = .456) changed over time. Participants become faster at completing items over time (F(1,21) = 9.97, p = .005). This study suggests that the AQ is a reliable measure of autistic characteristics.

2 Video Games and Addiction in Relation to Shyness, Loneliness, Locus of Control, and Social Anxiety
Anwar Hadeed, Liz Nielsen, Ryan Mulligan, and Stacey Zaremba
Moravian College, Faculty Adviser: Dr. Stacey Zaremba

The relationship between shyness, loneliness, and social anxiety and video game usage was investigated in 205 participants. Results showed that significant relationships were found between shyness and loneliness and excessive video game use. Social anxiety was not correlated with excessive use in this sample. The findings provide support for the idea that shyness and loneliness may be risk factors for problematic video game use.

3 Music and Emotion: Indirect Measures
Dr. Laura Edelman, Carly Baron, Emily Rybnick, and Catherine Zimel
Muhlenberg College, Faculty Adviser: Dr. Laura Edelman

In order to avoid demand characteristics in music and emotion research, Vastfjall (2010) suggested using indirect measures to assess emotional responses to music. Two studies were done using an emotion word-stem completion task. We chose to use a word stem completion task to measure musically induced emotions, as it is not subject to demand characteristics, does not require unnatural laboratory conditions, creates measurable data and allows positive and negative emotions to be distinguished. Across two experiments 144 participants heard music with a positive or negative emotional tone. While listening they were asked to complete 30 word stems which could be made into positive, negative, or neutral words. There was a significant interaction between the emotional tone of the music and the tone of the words completed, supporting our hypothesis that indirect measure of emotion can be utilized within studies of musically induced emotions.

4 Watch Your Mouth: Language Structure and the Assignment of Blame
Jennie Goldberg, Stephanie Solomon, and Jordana Sklover
Muhlenberg College, Faculty Adviser: Alexandra Frazer

Previous research has indicated that there may be a relationship between language structure, referent specificity, and the perception of violent events (Henley et al., 1995; 2002). In light of recent events highlighted in the media of racist police brutality, we wanted to understand how language affects judgments of responsibility. Specifically, we wanted to examine how we assign blame to the aggressor or the victim. We created mock news stories that varied in structure (passive or active voice) and referent specificity (i.e. “incident” or “shooting”) to examine this effect. We asked participants to answer questions about the scenarios and asked them to write a summary of the story as they remembered it. We are currently working on a content analysis of the stories as recalled by participants. We propose that understanding subtle differences in language that contribute to victim blaming and inequality is an important component of social justice.

5 Different Attentional Processes in Direct and Indirect Word Naming
Dana Gallant, Samantha Kay, Isha Markna, Maggie Dalena, and Mengyan Li
Lehigh University, Faculty Adviser: Dr. Padraig O'Seaghdha

We studied attention in preparation of spoken words by examining the degree to which preparation is reflected in a simultaneous unrelated secondary task. In this dual task paradigm, the primary task was to name pictures (direct retrieval) or produce the same names from associative word cues (indirect retrieval). The names were related in
form or unrelated. The secondary task was to indicate the
direction of arrows that appeared above the pictures or
associative words. We predicted that the benefit of naming
related pictures would be reflected in the secondary task.
However, for the indirect associative cuing task,
performance of the secondary task could interfere with
retrieval and thus remove the advantage of form
relatedness. In that case, there would be little or no
influence of the primary task on the secondary task. If so,
the indirect associative cuing task may not be a valid
procedure for studying normal word production.

6
Women in Leadership: The Effect of Counterstereotypic
Female Primes on College Women's Self-Leadership
Stereotypes
Emily Crawford
Lafayette College, Faculty Adviser: Dr. Susan Basow
Study investigated how exposure to primes of women
leaders, and the perceived similarity of those primes,
influenced identification with leadership gender
terotypes. Participants were female students of Lafayette
College in Easton, Pennsylvania. The study used a 2 X 2
design in which fabricated feedback indicated whether
participants’ stereotypical or counterstereotypical gender
traits were similar or dissimilar to the women primes, who
were either presented as mothers or with no mention of
family life. Implicit self-stereotypes and explicit
identification relative to leadership qualities were
measured. It was expected that exposure to the women
leaders in the similar condition would produce
counterstereotypic implicit self-leadership stereotypes. For
participants in the dissimilar and mother condition, strong
desire for children was expected to serve as a buffer.
Acceptance of feedback was expected to qualify the extent
to which participants are affected by motherhood status
and similarity feedback. Results are discussed in light of
these hypotheses.

7
The Effects of Different Beliefs on Attitudes Toward
Schizophrenia and its Implications
Joseph Rorem, Matthew Herbener, Rebecca Schuck, Lauren
Kostman, and Nicole Hirschenboim
Muhlenberg College, Faculty Adviser: Alexandra Frazer
We examine the influence of causal beliefs (implicit and
explicit) on the social stigma of schizophrenia. Such beliefs
include the just world belief and the biogenetic explanation
of mental illness. The just world theory states that the
world is fair and just, and therefore good things come to
those who deserve them and bad things come to those who
have done wrong. People who believe in biogenetic causes
of mental illness believe that mental illness is caused by
biological or genetic factors. We prime participants with
one of these worldviews by varying the word choice in a
vignette about a person with schizophrenia. Then, we
measure implicit beliefs using MouseTracker software and
explicit beliefs using a social distance scale. We are
currently finishing data collection, but predict that implicit
and explicit stigma will be affected differently by the
manipulation of causal beliefs.

8
The Effect of Gender Stereotypes on the Perception of
Emotion
Emily Gorby, Becca Hahn, Hannah Holmlund, Meredith
McAllister, and Brooke Liebensohn
Muhlenberg College, Faculty Adviser: Alexandra Frazer
Gender stereotypes describe women as more likely to show
happiness and sadness and men more likely to show anger.
The authors assess how gender stereotypes impact the
perception of emotion. We examine how certain jobs are
associated with certain characteristics stereotyped to be
male or female by presenting gender consistent,
inconsistent, or neutral scenarios. Participants examine
different emotional expressions on men and women
(specifically anger, sadness, happiness, and neutrality) in
images presented with MouseTracker. Participants choose
which expressions are shown as quickly as possible,
exposing their gender biases. The researchers are still
collecting data.

9
Decisions to Terminate Life Support: Influence of
Perceived Agency and Experience
Benjamin Herbsman, Eric Quitter, and Nicole Bilgram
Muhlenberg College, Faculty Adviser: Jeffrey Rudski
Decision to terminate life support is often believed to be
influenced by conceptions of a patient’s experience. We
found that considerations involved in the decision to
terminate life support is more often influenced by
estimates of a patient’s level of agency, particularly in cases
of higher brain death.

10
Biopsychosocial Influences on Depression: Does
Medication Distract us from Social Causes?
Lauren Knepper, Jessica Sperber, Clara Hinchcliffe, and
Madeline Tremont
Muhlenberg College, Faculty Adviser: Jeff Rudski
Women are diagnosed with depression at twice the rate of
men, with 1 in 4 American women taking antidepressants.
Several social commentators have raised the question of whether antidepressant use promotes social quietism, essentializing depression within people and distracting us from addressing major contributive social factors such as disempowerment. Participants read a brief description of depression caused by biological (e.g., genetic contribution), psychological (e.g., stress), and social (e.g., unrealistic body expectations) factors for either men or women and responded to an online survey. Primary causal factors were ranked psychological, then biological, and then social. These distributions were sensitive to race and gender; social primacy was more likely when considering depression in men, and when participants were non-White. Participants prioritizing social causation had more concerns with medication, including it distracting us from depression’s ultimate causes and being less effective/appropriate. Future research should focus on the perceptions of depression in men.

11 Adolescents in Healthy Contexts (AHC)
Nathan Bennett, Samantha Cieniawa, JD Edgard, Sneha Joseph, Cameron Kennedy, and Leah Masiello
Ursinus College, Faculty Adviser: Dr. Kneia DaCosta

Focus groups were conducted in a local urban middle school which informally assesses the students’ knowledge of concepts and processes related to media literacy, generally, and commercial media literacy in particular. Many studies have found a connection between exposure to low-nutrient, calories dense foods (i.e. “junk”) and obesity in youth. Five trained researchers met with students in 5th through 8th grades in grade-segregated groups. Three themes were clear to all the researchers and also identified by the research mentor: 1) 5th graders appeared more knowledgeable about health and nutrition and the relationship to obesity, 2) there was substantial mixed messages reflected in the student responses regarding healthy foods, obesity, and brand/commercial influence and 3) students associated commercial “jingles” with the foods that were discussed rather than direct scripted (taglines or language). Diet took on unclear meanings for these students who also had unclear definitions for obesity. These findings will inform our development of a more developmentally appropriate, ecologically relevant commercial literacy program for this partner school.

12 The Impact of Body Objectification on Student Athletes
Paige K. Abronski, Stephanie L. Cooper, and Kneia O. DaCosta
Ursinus College, Faculty Adviser: Kneia DaCosta

Increasing evidence supports suggests athletes in sports in which appearance is a major focus are likely to self-objectify more than other athletes. The current study examined seven groups of male and female student athletes from a small liberal arts college who participated in team-segregated focus groups facilitated through use of a semi-open ended protocol. A brief survey of semi-open ended questions was used to tap into participants’ responses to body-specific stimuli individually and in group. Using Dedoose, an online app for mixed method analysis, significant differences among sexes were found: males had fewer themes in body objectification, food, and social pressure. For females, food and body objectification were the main focus of discussion. Food was discussed 128 times while body objectification was mentioned 142 times. All women totals were higher than those for men. Thus, we found the gender distinction more influential in these differences, rather than the appearance-based teams.

13 Hemispheric Lateralization of Global and Local Auditory Processing
Emily Black, Jennifer Jones, Brennan McFarland, Mary Foggo, Sarah Godfrey, Hale Soloff, Jeffrey Lubin, Tess Wiggin, and Jennifer L. Stevenson
Ursinus College, Faculty Adviser: Jennifer Stevenson

Neurotypical and autistic individuals process images and sounds differently. A phenomenon known as the global precedence effect has been demonstrated in neurotypical individuals. More specifically, neurotypical individuals process global, or whole images and sounds faster and more accurately than they do local, or detailed aspects of images and sounds. In addition, neurotypical individuals have shown asymmetrical hemispheric lateralization for local and global processing of sounds. In other words, activation in the left hemisphere is associated with the local processing of sounds while activation in the right hemisphere is associated with the global processing of sounds. The current study explores the lateralization of local and global processing in neurotypical and autistic individuals during an auditory task using electroencephalography (EEG). Data collected from 37 participants demonstrates evidence of the global precedence effect with participants responding significantly faster and more accurately in global trials than in local trials regardless of condition and significantly faster and more accurately in the compatible condition than in the incompatible condition. Additionally, differences in average brain activity, measured by T3 (electrode on left temporal lobe) and T4 (electrode on right temporal lobe) electrodes, were observed during local processing. This indicates the possibility of hemispheric asymmetry during auditory processing.
14
Building a Brain-Computer Interface: Practical lessons learned in trying to translate brain signals into robotic action
Elliott Goldberg, Miranta Louka, Christine Scherb, Jalen Smith, Jake Waleski, Korrinne Yurick, and Dr. Patrick Williams
Muhlenberg College, Faculty Adviser: Dr. Patrick Williams

The possibility of using a Brain Computer Interface (BCI) to operate assistive devices is currently an intense area of research for neuroscience. While significant gains have been made by recording signals intracranially, implantation of electrodes is invasive and expensive. A low-cost non-invasive method with a high signal yield is needed. We have begun to investigate the translation from brain signals to robotic action using EEG. The goal of the research project is to convert brain signals to commands for a wheeled robot to tell it “where to put the groceries:” fridge, microwave, or cupboard. EEG is the most widely used technology for non-invasive BCIs, but professional-grade equipment is expensive, and low-cost consumer-grade devices have not fared well as substitutes for professional devices because of poor signal quality and low channel counts. The EEG board we are evaluating is a cost-effective open-source device released by OpenBCI in December 2014. We report on the pragmatic details we have learned that are required to understand and operate a BCI. While our work is still in progress, we address obstacles encountered in such areas as: placement of surface electrodes, choice of task to generate useful brain signals, software selection, electrical artifacts, and wireless communications.

15
The Effect of Housing Conditions on Ingestive and Reproductive Behaviors of the Syrian Hamster
Carlie Skellington
Lehigh University, Faculty Adviser: Dr. Jill Schneider

Energy homeostasis is an equilibrium in availability of oxidizable metabolic fuels and is maintained by changes in behaviors such as food intake, food hoarding, locomotion, as well as physiological changes in metabolic rate and reproduction. In observing how energy balance functions, the Golden Syrian hamster is an effective animal model because hamsters rarely change their food intake, yet they manage to gain body weight. Similar to humans, hamsters hoard food in their ‘homes’ and do more hoarding when they are hungry (for example, after a period of restricted dieting). It is often convenient to save money by housing hamsters in groups after they are weaned from their mother. There is some indication from other species that this might actually increase variability in many traits, which would cloud the effects of drugs under investigation. For example, a study performed at UC Berkeley discovered that the coefficient of variation (CV) in both males and female mice increased by 37% when the animals were group-housed rather than single-housed. In its natural environment on the border of Syria and Turkey, the Golden Syrian hamster lives in solitude in underground burrows—consistently guarding its home from intruders. Therefore, male hamsters often fight and attack one another when group-housed in a lab environment. They also establish dominance hierarchies, and their rank might be expected to affect their hormone levels. These hormone levels might be expected to affect many traits, and thus, introduce variability. In addition, stress-induced housing situations have been shown to reduce activity level in males. In group-housed hamsters, glucocorticoid and sympathetic responses are activated. While housing situations have been observed to affect the behavioral and biological responses of animals, the degree to which housing affects many individual traits in Syrian hamsters is unknown. To test the effect of housing conditions, our experiment involves measuring specific behavioral and neurological responses among group-housed and single-housed male Syrian hamsters to determine whether the variation among the groups is statistically significant. With this knowledge, we will identify whether the behavior of group-housed animals is significantly influenced by their housing condition.

16
A Cry for Help: Ultrasonic Vocalizations, Serotonin Deficiency, and the Expression of Mouse Maternal Behavior
Ami Shah and Sapna Shah
The College of New Jersey, Faculty Adviser: Dr. Jeffrey Erickson

Effective maternal care in rodents depends in part on ultrasonic vocalizations by the pups that trigger survival-promoting behaviors by the dam. Defects in either call transmission or call receipt could lead to sub-optimal maternal care and increased pup mortality. Pet-1 gene deletion results in a 70% loss of central serotonin neurons and complete loss of effective maternal behavior. Specifically, all pups born to Pet-1 knockout dams die within five days of birth and ~25% of Pet-1 knockout pups born to normally behaving Pet-1 heterozygous dams die within the same time frame. To determine whether abnormal call production could contribute to this mortality, we recorded ultrasonic vocalizations from neonatal wild type, Pet-1 heterozygous, and Pet-1 knockout pups to analyze and compare the vocalizations for genotype-specific differences in call structure. To determine whether the ineffective maternal behavior of Pet-1 knockout dams is due to a compromised ability to hear or interpret pup calls, we plan to compare the behavioral responses of wild type and Pet-1 knockout dams to playback recordings of pup vocalizations.
The results of these studies should inform future experiments designed to better understand the link between the brainstem-serotonin system, ultrasonic vocalizations, and maternal behavior.

17
Co-immunoprecipitation of PSD-95 and Nitric Oxide Synthase in Female Hamsters
Natasha Qureshi and Jennifer Swann
Lehigh University, Faculty Adviser: Dr. Jennifer Swann

Male and female behaviors are very different. Because the brain regulates behavior, there must be something in the brain that differs between them. One example of a behavior that differs between the two is sex behavior. Sex behavior is controlled by different brain areas in males than in females. The medial preoptic area of the hypothalamus (MPOA) regulates sex behavior in males, but not in females. The part of this pathway we are concerned with is the association between PSD-95, a scaffolding protein, and Nitric Oxide Synthase (NOS). In the preoptic area of rats, d’Anglemont de Tassigny (2009) demonstrated that NOS is physically associated with the PSD-95 in males and females. A previous study done in the Swann Lab by Tim Garelick (2011) showed that when Syrian male hamsters were castrated, PSD-95 and NOS were longer associated with each other. This experiment has not been done in female hamsters. We are not sure whether PSD-95 and NOS will be associated with one another in females, with or without steroid hormones, and we would like to explore this. Because of Tassigny’s results, we expect that PSD-95 and NOS will be physically linked to one another, eliminating this area as sexual dimorphic.

18
Involvement of the Wrist During the Grasping of Objects of Different Shapes
Matthew Barrett, Noah Steinberg, and Sally Trout
Lafayette College, Faculty Adviser: Dr. Luis F. Schettino

During a reach-to-grasp movement, normal participants preshape their hands in order to conform to the shape of the target object. Most of the work conducted on prehension has focused on the positioning and coordination of the digits. Relatively little research has investigated the involvement of the wrist. Nonetheless, the wrist exerts a powerful influence on the overall organization of movement. Our experiment was designed to collect information on the role of the two-dimensional wrist joint on finger position during grasping. Motion-tracking data of fingertip position and the dorsum of the hand was recorded using an electromagnetic system (Polhemus, Inc.). Ten participants grasped spherical, square, and convex objects presented in horizontal and vertical orientations. Analysis of absolute finger positioning and positioning with respect to the dorsum of the hand revealed higher variabilities for the relative measure. This indicates that the wrist joint was modulated across trials to ensure final fingertip position, an example of motor redundancy. Fingertip variability also varied across object shapes and across particular digits. This latter finding suggests that the positioning of some digits is closely related to that of the wrist.

19
Determining the Efferent Projections of the MPNmag of Syrian Hamsters
Sylvia Lee
Lehigh University, Faculty Adviser: Dr. Jennifer Swann

The magnocellular medial preoptic nucleus (MPNmag) plays an important role in the regulation of male sex behavior and is sexually dimorphic as it does not play a role in female sex behavior. In this study, we aim to identify sex differences between male and female Syrian hamsters based on the efferent projections of the MPNmag in males and females. We have done this by using Dil injections and fluorescent microscopy. We have seen ipsilateral projections to the rostral forebrain, hypothalamus, and brain stem in males. In females, we expect to see either different projections than of males or similar projections of less density, both of which would further confirm a sexual dimorphism.

20
Design of a modular semi-automated maze for testing fly visual behavior
Emin Eminof
Muhlenberg College, Faculty Adviser: Dr. Patrick Williams

Two alternative forced-choice tasks are particularly useful for eliciting responses from organisms about their perception of a stimulus in order to gain a basic understanding of underlying behavioral mechanisms. One paradigm that is available is a multi-layer T-maze where the distribution of flies in the output lanes provides information that can be used to make inferences about fly behavioral choices. However, designing and manufacturing an entire maze often requires one monolithic piece which can be costly when redesigning. By using 3D printing methods that are quick and affordable, I was able to modularize the maze into single choice-point segments, thus resulting in a maze that is much simpler and less costly to apply to multiple experiments. Furthermore, these modularized segments provide the opportunity for automation of the output lanes that would allow for increased data collection and accuracy.
21 Standardizing Quantification of Sexual Behavior of Male Syrian Hamsters
Dean Granot and Clifford Zinn
Lehigh University, Faculty Adviser: Dr. Jennifer Swann

Procreation is an important aspect to the overall survival and evolutionary success of a species. Therefore, the study of copulation is a crucial topic for research and immensely studied. Researchers answer many questions about sex specific neural pathways in the brain based on their analysis of behavior, because the brain controls behavior. However, individual researchers analyze the brain and quantify data in different ways and approaches. This lack of a general standard for quantification can be problematic for drawing significant conclusions. In order to successfully gather data from these approaches, researchers must use well-documented, repeatable and simple techniques. Therefore, the goal of this study is to optimize the current techniques and formulate a method to standardize the analysis and quantification of robust behaviors, such as mating behavior. Using the male Syrian hamster as a model, sexual behavior was captured on video recordings and analyzed /quantified using MATLAB. Creating a standardized method for quantifying sexual behavior will allow for an efficient analysis that can be shared among researchers worldwide. The beauty of this technique is that it can be altered to a researcher’s specifications and is not limited to any one type of behavior.

22 The Effects of Olfaction on Taste Perception
Micheal Hogan and Abraham Vigdorchik
Muhlenberg College, Faculty Adviser: Dr. Laura Edelman

Frank and Byram (1988; as sited in Small and Prescott, 2005) found that food odors play a huge role in changing the perception of taste. When one was given the odor of strawberry and vanilla while drinking a sucrose solution they perceived the solution as sweeter. This led Small and Prescott (2005) to believe flavor represents a functional sensory system with multiple inputs that are not exclusive to the mouth. Since olfaction is one of the key components in the perception of taste, we believe that if a tasteless solution is paired with an odor, the solution will take on the taste of the odor. Based on Small and Prescott’s findings we hypothesize that a subject who samples a tasteless solution paired with the odors vanilla, raspberry, and coconut will perceive a mild taste of these odors. Similar to Small and Prescott we use olfaction to influence taste by having the subject smell an odor while they drink a tasteless solution. Taste perception is then measured with an intensity scale, allowing us to gauge the effects of olfaction on taste perception.

23 Imaging Dopamine Receptors
Andrea D. Ramsay
Lehigh University, Faculty Adviser: Dr. Jennifer Swann

It has been observed in Syrian hamsters that the magnocellular medial preoptic area (MPNmag) is involved in the regulation of male sexual behavior. Although structurally the area can not be considered sexually dimorphic, it does function differently between sexes. When this area is lesioned in males and females, males do not display sexual behavior, whereas females continue to display sexual behavior. In hopes to elucidate this question several experiments have implicated dopamine (DA) as being involved in the regulation of sexual behavior (Dominguez et al). Although DA is involved, the location of its action is still unknown. The purpose of these experiments is to perfect the technique for imaging dopamine receptors, that will be used to later discover the binding sites in the MPNmag. Several lines of data support the hypothesis that there are dopamine receptors in the nucleus accumbens and will serve as an ideal template for imaging dopamine receptors using Immunohistochemistry and a dopamine receptor 2 antibody. The knowledge of these binding sites will hopefully lead to the understanding of what other nuclei are involved in the signaling pathway that determines whether or not sexual behavior should be displayed.

24 Investigating the extreme male brain theory using eye-tracking
Sarah H. Godfrey, Mary B. Foggio, Brennan W. McFarland, and Jennifer L. Stevenson
Ursinus College, Faculty Adviser: Dr. Jennifer Stevenson

Empathizing is the ability to understand thoughts and feelings of others and to respond with appropriate emotions. Systemizing is the drive to analyze variables in a system. Men are typically better at systemizing than women and the opposite is true for empathizing. The Extreme Male Brain (EMB) theory of autism hypothesizes that men on the autism spectrum will exhibit increased systemizing abilities and reduced empathizing abilities when compared to neurotypical individuals. This study aimed to investigate if the EMB theory is present in the general population by comparing neurotypical men and women on systemizing with a mental rotation task and empathizing with an emotional face processing task. Participants also completed the Autism-Spectrum Quotient (AQ), a measure of the number of autistic traits. We hypothesized that men with a high AQ score would perform better on the mental rotation task than women with a high AQ score, while women with a low AQ score would
outperform all men on the emotional face recognition task. Utilizing the eye-tracker during these tasks allowed us to examine the relationship between gaze pattern and the presence of autistic traits.

25 The use of Nicotine as an Antinociceptive in Lynx1 KO vs Wild Type Mice
Chris Hoke and Sana Ali
Lehigh University, Faculty Adviser: Dr. Julie Miwa

Pain can be alleviated by drugs that act as agonists to opioid receptors. The Lynx1 gene functions in many different areas of the cholinergic system, one being pain, which will be the main focus of this study. A common anti-nociceptive is nicotine which binds to pain receptors in the peripheral nervous system. Our purpose is to test if the Lynx1 mice have a higher affinity for the nicotine alleviating them in the pain caused by thermal stimulation. We worked with Lynx1 KO mice and tested them against Wild Type mice for how long they could withstand heat stimulation after injections of 1mg/kg of nicotine (when looking at the respective weight of each mouse). Following up on each trial, we also perform the hot plate test with each mouse injected with saline as a control. Through the use of nicotine as an alternate for pain alleviation we expect to see an increase in pain alleviation for Lynx1 KO mice.

26 Behavior Patterns of Captive African Penguins (Spheniscus demersus) at the Lehigh Valley Zoo Compared to Those in the Wild
Angela Snyder and John A. Cigliano, PhD
Cedar Crest College, Faculty Adviser: John A. Cigliano, PhD

The African penguin (Spheniscus demersus) is classified by the IUCN as endangered because of habitat destruction, overfishing of prey, and climate change. Efforts to prevent the extinction of this animal have been unsuccessful, including captive breeding. Because prior attempts at increasing this species’ numbers have failed, the American Zoological Association (AZA) organized a Species Survival Plan (SSP) for S. demersus in the late 1990s. The SSP lays out strict guidelines that must be followed by participating organizations. The ultimate goal of the SSP is to release viable individuals into the wild to survive and reproduce. One of the main indicators of future survival is behavior. For an individual to survive, it must be able to carry out the natural behaviors in the wild, as opposed to behaviors developed in captivity. The goal of this study was to observe the behaviors of African penguins in captivity at the Lehigh Valley Zoo and compare those to wild behaviors. Identifying important behaviors that are missing or different will allow the Zoo to develop management plans to preserve natural behaviors. Initial observations indicate that some behaviors are conserved whereas other behaviors are more greatly affected. Statistical analysis is in progress, and conclusions will be presented.

27 The Effect of Caffeine on the Strength of Association in C. elegans
Inka Leprince, Laura McCann, Saran Kunaprayon, Joe Brague, and Margaret Kenna
Lehigh University, Faculty Adviser: Dr. Margaret Kenna

Caffeine is the most widely used drugs in the word. It is known to stimulate alertness in mammals, but can this affect the ability to speed up learned associations? Similar to how Pavlov used dogs’ salivation as an indication of a formed association of a bell’s ring with food; in this study, we use C. elegans’ chemotaxis index to determine the strength of association between a high NaCl concentration and the presence of food. The nematodes were given three days to associate the presence of food, Escherichia coli, with a high salt concentration. They were subsequently plated on assay plates that had an NaCl gradient. Half of these assays also had a uniform 10mM caffeine concentration. The C. elegans that were plated on the caffeinated assays consistently had stronger chemotaxis indexes as compared to their non-caffeinated counterparts, suggesting that the caffeinated C. elegans had stronger associations with a high salt concentration and food. There are not enough replications to be able to conclude a significant difference between the caffeinated and non-caffeinated assays. Future experiments may confirm the trend that caffeine positively affects the chemotaxis of C. elegans.

28 Investigating the Effect of Community Size on the Emergence and Frequency of Aggressive Behaviors in the Cichlid Fish Cichlasoma octofasciatum
Laurel Minott, Emma Allen, and Audrey J. Ettinger
Cedar Crest College, Faculty Adviser: Dr. Audrey Ettinger

Animal models are often used to study questions involving complex human behaviors; cichlid fish species have been used to examine many such behaviors, including aggression. Here, we investigated the correlation between the community size of juveniles of a cichlid species, Cichlasoma octofasciatum, and the emergence and frequency of aggressive behaviors. We hypothesize that individual fish in smaller social groups will show aggressive behaviors earlier and at a higher frequency because aggressive acts have a higher probability of being successful and elevating the fish in the social hierarchy. To investigate this relationship, we observed the frequency in which aggressive behavior occurred in multiple age matched communities: one of
large size, two duplicate groups of small size, and another small group created later on from the initial large group. The two small groups were created to act as a control; if any deviation occurred, it was indicative of some other factor influencing the emergence of aggression. Our data suggests that there is a negative correlation between brood size and display of aggressive behaviors.

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Lynx1 gene in association with birds song learning capabilities
Yu (Cecilia) Wang
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Song learning is important in birds because song is involved in mate attraction, communication and species discrimination. Different bird species vary in their song learning capabilities: closed-ended learners can only learn songs within a defined time frame while opened-ended song learners can learn new songs throughout their life time. Lynx1 is a gene involved in learning and it can bind to the nicotinic receptors of the cholinergic system. Once Lynx1 gene binds on the receptors, it acts as a molecular brake on learning plasticity. Removal of Lynx1 gene in laboratory mice has been shown with elevated learning abilities. Thus we hypothesize that variations in Lynx1 among bird species may be related to their different song learning capabilities. Thus we tested the selection of Lynx1 gene vary across different avian species, and the preliminary results suggest that selection pressure on Lynx1 are different in closed-ended and opened-ended song learning birds.

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Polyphenol Treatment for Parkinson’s Disease in a LRRK2 Drosophila melanogaster Model Improves Motor Function and Dopaminergic Neuron Survival
Brian Cantor, Rose Bayer and Elaine R Reynolds
Lafayette College, Faculty Adviser: Dr. Elaine Reynolds

Parkinson’s disease (PD) is a chronic, neurodegenerative disorder that affects 4 to 5 million people worldwide. PD is characterized by motor impairments such as tremors and rigidity due to dopaminergic (DA) neuronal death in the substantia nigra pars compacta. Several mutations with impaired mitochondrial function including LRRK2 (Leucine-rich repeat kinase 2) have been shown to impact PD onset (Guo, 2012). Production of reactive oxygen species by impaired mitochondria is associated with aging and neurodegeneration and most likely contributes to development of PD. Polyphenols exhibit neuroprotective effects by decreasing oxidative damage and activating certain protective hormetic pathways (Vanzour, 2012). We hypothesized that the addition of polyphenols to the diet of LRRK2 flies would exhibit protective effects on neurons, improve lifespan and reduce parkinsonian symptoms. LRRK2 knockout flies were generated using an antisense construct expressed in DA neurons in the brain. Adult flies were fed a mixed solution of polyphenols every 5 days. Survival percentages were calculated for polyphenol-treated and controls every 5 days, while assays for climbing ability and DA degeneration were performed at various times during lifespan. While no effect on lifespan was observed, addition of polyphenol did reduce some motor symptoms and improved DA neuron survival.

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The effect of serotonin deficiency on “fictive” breathing in the isolated neonatal mouse brainstem/spinal cord
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The College of New Jersey, Faculty Adviser: Dr. Jeffery T. Erickson

Pet-1 is a transcription factor that is required for the production of a full complement of central serotonin neurons. Targeted “knockout” of the Pet-1 gene results in a selective 70% loss of central serotonin neurons that is associated with detectable breathing abnormalities in intact neonatal mice. These abnormalities include a decreased breathing frequency, an increased incidence of spontaneous apneas, and delayed autoresuscitation responses to experimentally induced apnea, compared to wild type littermates. However, the underlying mechanism(s) by which the severe loss of central serotonin neurons produces these breathing deficits is not yet known. To address this issue we have assembled an in vitro electrophysiology recording system to measure neural output from the central respiratory pattern generator of the isolated neonatal brainstem/spinal cord. Brainstems were maintained in artificial cerebrospinal fluid under experimentally defined conditions of pH, temperature, and environmental oxygen levels. Suction electrode recordings of neural discharges were made from the fourth cervical nerve rootlet and the hypoglossal nerve, both of which provide a measure of central respiratory drive. We plan to use this system to better define the role of serotonin neurons in the development and maturation of breathing behavior in neonatal mice during the early postnatal period.
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The Effects of Ginkgo biloba on Developing Brain Tissue in a Chicken Embryo Model
Kristin Konapelsky, Taylor Perkins, K. Joy Karnas, and Audrey J. Ettinger

Cedar Crest College, Faculty Adviser: Dr. Audrey Ettinger
K. Joy Karnas

Stroke is the third leading cause of death in the United States. In traditional Chinese medicine, Ginkgo biloba is used as a stroke treatment; more recently, Gingko has been shown to be neuroprotective via several antiapoptotic mechanisms. However, its potential effects on developing embryos in pregnant women are not well known, and these effects are of medical concern since Ginkgo is widely available as an herbal remedy. Therefore, this study focused on the potential effects of Ginkgo on developing brain tissue of chicken embryos as a model for human embryos to predict any adverse consequences on the development of the human fetus. We injected the suggested clinical human dose of Ginkgo biloba into chicken embryos on the sixth day of development, and injected five times the recommended amount into other chicken embryos, while a third group received only solvent. The morphology of each embryo was assessed on the thirteenth day of development, RNA was isolated from brain tissue and used as a template for cDNA synthesis, and then the differences in gene expression in the cDNA between control and treated samples were assessed with PCR arrays. This experiment will contribute to understanding the safety of developing fetuses during Ginkgo treatment.

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Does Prenatal Nicotine Exposure Alter Serotonin Neuron Development in the PET-1 Knockout Mouse?
Jessica A. Nardone, Jeffery T. Erickson, Amanda Stewart
The College of New Jersey, Faculty Adviser: Dr. Jeffery T. Erickson

Pet-1 is a transcription factor that is required for the development of a full complement of serotonin neurons in the mammalian brainstem. Targeted deletion (knockout) of the Pet-1 gene in mice results in a severe (~70%) loss of brainstem serotonin neurons, detectable breathing abnormalities, and increased neonatal mortality. These characteristics are reminiscent of Sudden Infant Death Syndrome in humans which has also been linked to a brainstem serotonin deficiency. We recently tested the effects of developmental exposure to nicotine on breathing behavior in neonatal Pet-1 knockout mice since nicotine is a suspected risk factor for SIDS. Surprisingly, nicotine exposure improved breathing behavior in these mice. To determine whether the improved breathing behavior in the Pet-1 knockouts could have resulted from a nicotine-mediated “rescue” of the serotonin neurons that are normally lost in these animals, we used designed based stereology to compare serotonin neuron number in wild type and Pet-1 knockout mice exposed to either saline (control) or nicotine during development. We found that nicotine exposure did not alleviate the severe serotonin cell loss in the knockouts and therefore a restoration of normal serotonin neuron number cannot account for the functional recovery of breathing we have observed in the nicotine-treated animals.

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Measuring the Effects of Prescription Drugs in a Chicken Model of Neural Development
Francesca Prendes, Jinalben Patel, Tayler White, Audrey J. Ettinger, and K. Joy Karnas
Cedar Crest College, Faculty Advisers: Dr. Audrey J. Ettinger and Dr. K. Joy Karnas

This study used developing chicken embryos as a model for understanding the effects of prescription drugs on developing human fetuses. Methadone, diazepam, and tetrathiomolybdate are prescribed to women during pregnancy for treating opiate addiction, epileptic seizures, and Wilson’s disease, respectively. Each of these drugs has been correlated with disruptions in human fetal development, but the conditions that they treat also carry significant risk to the fetus and to the mother. To better understand the effects of these drug treatments on gene expression in the developing brain, chicken eggs were inoculated on day 6 of development with control solvent (methanol and/or PBS), a human clinical dose equivalent, or five times the equivalent of a clinical dose of one of these drugs dissolved in solvent. The embryos were examined and dissected on day 13, changes in development were noted, and selected tissues of the embryo were isolated. RNA was isolated from the brain tissue of a control chick and corresponding tissue of a 5x clinical dose chick, copied to cDNA, and analyzed via a PCR microarray to probe gene expression to observe any differences. These results will improve our understanding of the effects of maternal prescription medications on developing fetal brains.
About Our Chapter

The Lehigh Valley Chapter of the Society for Neuroscience is a local affiliate of the National Chapter of the Society for Neuroscience (SfN). SfN is the largest professional organization committed to the discipline of neuroscience worldwide. The Lehigh Valley SfN Chapter is composed of primarily neuroscience faculty, undergraduate and graduate students, clinicians and interested public. This local chapter is dedicated to fostering social responsibility and leadership abilities in all chapter members as they engage in scholarship and public outreach regarding the brain and benefits of neuroscience research through brain awareness service learning programs.

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