29th ANNUAL BROOKLYN COLLEGE SCIENCE DAY

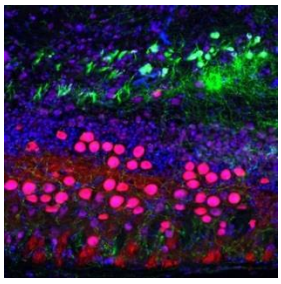
Brooklyn College Science Day is sponsored by the NIH MARC, NYS CSTEP, and NYS STEP programs.

PROGRAM

9:30 AM	**POSTER SETUP (Student Center)**
10:00 AM	**STUDENT PRESENTATIONS AND JUDGING (2nd floor)**
12:15 PM	**LUNCH IN THE GOLD & MAROON ROOMS (6th floor)**
12:30 PM	**WELCOME AND REMARKS**
	PRESENTATION OF AWARDS **High School (HS) Division** **Undergraduate (UG) Division** **Graduate (GR) Division**

ALL ARE INVITED TO LUNCH IN THE GOLD & MAROON ROOMS

Thanks to the staff of the Brooklyn College Student Center and the office of Government and External Affairs for their assistance



Cover Photo by Paul M. Forlano.

"**Catecholaminergic neurons (green) lie just dorsal to vocal motor neurons (pink) in the caudal hindbrain- spinal cord of the plainfin midshipman fish**."

BIOL - 100 THE ROLE OF DUCKWEED MICROBIOME IN BIOREMEDIATION OF ANTIBIOTICS AND ARSENIC

Sevara Mallaboeva (HS), Midwood High School, Theodore R. Muth, Brooklyn College

Duckweed could possibly be used as a bioremediation tool for the treatment of toxins and xenobiotics contaminating freshwater ponds and lakes in New York City. The microbiome of duckweed plays an important role in helping duckweed survive in contaminated bodies of water. In this research, duckweed was collected from three sites in Prospect Park and tested for antibiotic and arsenic resistance by plating the surface bacteria on R2A agar and agar with Bushnell/Haas (both media for the growth of oligotrophic bacteria). The colonies on the antibiotic and arsenic plates were further analyzed by sequencing the colonies done by Genewiz. The results revealed the microbiome of duckweed to be resistant to antibiotics, sulfadiazine and sulfamethoxazole, and arsenic. The bacterial colonies were found to be gram negative. The sequence results showed that Chryseobacterium indologenes (antibiotic plates) and Comamonas testosteroni (arsenic plates) are two bacteria that could possibly be present on the surface of duckweed. Previous research has found that the duckweed microbiome plays a role in duckweed's bioremediation potential. This research identified two bacteria that are part of the duckweed microbiome and could contribute to their ability to bioremediate antibiotics or arsenic. Thus, further research must be performed to analyze the effect of these bacteria on duckweed and its ability to bioremediate contamination in bodies of water.

BIOL - 101 UNKNOWN STREPTOCOCCUS STRAIN SPECIFIC TO KILLING AND INHIBITING GROWTH OF NEISSERIA GONORRHOEAE AND NEISSERIA ELONGATA

Emily Movsumova[1] (HS), Jingbo Kan[2], Nicolas Biais[2]
[1]Midwood High School
[2]Brooklyn College

An unknown strain of bacteria was discovered to exhibit a unique property which killed and inhibited the growth of Neisseria elongata, a common human commensal species. In this study, various tests and experiments were employed to identify more traits and characteristics about this unknown strain. Through 16s rRNA sequencing and the use of the Protein BLAST database, the genus of the bacteria was found to be Streptococcus. A separate specificity test uncovered that the Streptococcus can affect the growth of both N. gonorrhoeae and N. elongata. Thirdly, another characteristic this strain expressed is that its lethality towards N. gonorrhoeae and N. elongata increased as it evolved over several generations, but lost that effectiveness when it was frozen in a -80°C bacterial stock, which indicates a possible epigenetic effect. Finally, a test was done to determine if the Streptococcus strain secreted an antibiotic as the possible mode of action that killed the N. gonorrhoeae and N. elongata, however the results do not yet indicate an antibiotic as the definite mechanism behind this phenomenon. Further research focused on the mechanism the Streptococcus bacteria utilized will need to be continued to possibly discover an alternate way to decrease the survivability of N. gonorrhoeae specifically.

BIOL - 200 SHEAR-FORCE DEPENDENT CHANGES ON THE GENE EXPRESSION OF CANDIDA ALBICANS

Rabia Mehmood (UG), Peter N. Lipke, Brooklyn College

The most common human fungal pathogen, Candida albicans, colonizes the human GI tract and causes systemic infection. Adhesins are proteins on the fungal cell surface that allow C. albicans to adhere to host cells, thus beginning the first step of infection. These adhesins have amyloid-forming sequences, which can be induced by applying force to C. albicans cells, in turn increasing biofilm formation. The purpose of this experiment is to identify a change in gene expression as a result of applied force. Based on preliminary evidence, we predicted that application of force to C. albicans cells would increase expression for the

genes DDR48, ALS4, IHD1, and ALS3, while TEF1 and ACT1 would not show any changes in gene expression. Shear force was applied to yeast cells for 2 minutes by vortex mixing, followed by an expression period of 40 minutes. Then, RNA was isolated and any contaminating DNA was digested before cDNA synthesis. Next, qRT-PCR, Nanostring, and RNASeq were performed to compare the number of replication cycles of TEF1 to the experimental genes. Our prediction that ALS4 and IHD1 would show upregulation of gene expression in response to applied force is supported by our PCR results. ALS4 upregulation is further supported by Nanostring results. ALS3 is shown to have slight upregulation through Nanostring results. DDR48 is known to increase expression in response to stress, but in our PCR results, we saw downregulation as a primary trend for DDR48, whereas in Nanostring, ⅔ of our results support this analysis. Nanostring analyses of 84 genes showed consistent upregulation of 14 genes after vortex mixing, whereas 15 genes were reproducibly downregulated. Therefore, application of shear force to C. albicans alters the transcriptional program.

BIOL - 201 A ROLE FOR BIOFILMS IN PATHOGENESIS

Aneesa Valentine (UG), Nicolas Biais, Brooklyn College

Neisseria gonorrhoeae has become resistant even to dual antibiotic treatment -- establishing itself as a modern day superbug. Targeting cellular aggregates could prove beneficial towards eliminating infection by disabling biofilm formation through eliminating extracellular DNA (eDNA). Similarly, studies have also found evidence in support of physical force utilized during cell-cell pulling interaction as influencing micrcrocolony and subsequent biofilm formation. That being said, this project seeks first, to find evidence in support of physical force modulating biofilm formation and then, to investigate the role of eDNA in biofilm formation in hopes of discovering novel targets for successful antibiotic therapy. To test the impact of physical force and eDNA on micrococolony aggregation, diffusion assays demonstrating liquid penetration into the microcolony and resistance assays measuring cell growth in the presence of DNAse, were conducted. Diffusion assays revealed quick diffusion of yellow microspheres (similar to antibiotic diffusion) into the microcolonies while resistance assays suggested a role for eDNA in early biofilm formation.

Support by NIH MARC.

BIOL - 202 SUPERTYPING OF HIPPOCAMPUS ABDOMINALIS

Amena Abbasi (UG), Jimiane Ashe, Tony Wilson, Brooklyn College

Hippocampus abdominalis serves as a model organism to use in investigating the relationships between the host organism and the microbial communities in which it thrives in and lives symbiotically with. We are able to use seahorses for genetic studies because they have a relatively simple structure for their MHC Class genes, as they only possess two loci, as compared to multiple loci that other organisms have. In order to draw correlations between the microbial community and individual seahorses, supertypes of the seahorses were administered. Supertyping is a form of data modelling in which subtypes with a high statistical value of relatedness become clumped together. As the data is run on the positively selected sites of the subtypes, the seahorses become grouped together into their respective supertypes. Positive selective sites allow us to group the seahorses on the basis of the genetic variation of advantageous genes in the population. Each supertype has attributes that are different from the other supertypes listed. These different groups are then able to be cross-linked to the microbial communities they thrive in.

Support by NSF DEB 1701788.

BIOL - 203 OPTIMIZING GROWTH AND SURVIVAL RATES OF JUVENILE HIPPOCAMPUS ABDOMINALIS THROUGH DIFFERENT FEEDING CONDITIONS

Aiman Hafeez (UG), Wajeh M. Syed, Jimiane Ashe, Tony Wilson, Brooklyn College

In this study, the growth and survival rate of juvenile H. abdominalis were observed from the day of their birth to day 75, with respect to their diets of either frozen or live food. Daily counts for live juveniles were conducted to assess the survival rate, and measurements for their length were taken on the 31st and 75th day of the study in order to test the hypothesis that rates and measurements between the two conditions would be equal. A t-test with unequal variance comparing lengths of both conditions gave a statistically significant difference while the comparison of the survival rate was not significantly different. The results of this study suggest that for H. abdominalis juveniles, rearing them on live Artemia nauplii would be a better choice as it provides a higher growth rate.
Support by NSF DEB 1701788.

BIOL - 204 UNCONVENTIONAL SECRETION OF GAPDH FROM THE CELL INTERIOR TO CELL EXTERIOR OF SACCHAROMYCES CEREVISIAE

Sarah Jadoo (UG), **Jordan Jean Pierre** (UG), Michael J. Cohen, Peter N. Lipke, Brooklyn College

The protein Glyceraldehyde-3-Phosphate Dehydrogenase (GAPDH) is found in the cell wall and cytosol of Saccharomyces cerevisiae. GAPDH plays a role in energy metabolism and converts glyceraldehyde-3-phosphate (G3P) into 1,3- bisphosphoglycerate acid (1,3BPG). The protein GAPDH does not have a signal peptide present, which is a chain of amino acids that signal a protein for translocation. GAPDH does not follow the classical secretion pathway since proteins without a signal peptide usually remain inside the cytosol. Therefore, GAPDH assays were performed to determine the unconventional secretion pathway of GAPDH to the outside of the cell wall. In this project, we measured the amount of GAPDH secreted onto the cell wall at various time points for wild type (BY4743) cells. Another goal was to measure the amount of GAPDH activity on the cell wall over a course of time to observe the range of activity from different cultures of the wild type strain. Based on our results, we have determined as time increases, the amount of GAPDH secreted also increases. The GAPDH concentration obtained from the wild type yeast cells was also compared to the concentration found from the mutant yeast cells. Genes that don't play a role in translocation of GAPDH to the cell surface will keep the concentration of GAPDH constant. However, genes that are involved in its translocation to the cell surface will change the concentration of GAPDH present on the cell surface. We observed muk1 and hsp82 knockout mutants to determine their function when the gene is normally present. We determined these genes do not have a significant difference in GAPDH secretion when compared to the wild type strain. Thus, these genes do not play a role in the unconventional secretion of GAPDH.

BIOL - 205 THE INTERACTION OF [SWI+] PRION WITH TRADITIONAL HISTONE POST-TRANSLATIONAL MODIFICATIONS IN THE BUDDING YEAST SACCHAROMYCES CEREVISIAE

Jailene Paredes (UG), Samantha N. Cobos, Elizaveta Son, Hermena A. Ibrahim, Bashnouna Salib, Royena Tanaz, Mariana P. Torrente, Brooklyn College

The discovery of prions has revolutionized the world of cell biology. Prions comprise alternative folding states of proteins that are able to propagate by transforming other protein molecules to the prion conformation. While they are associated with negative outcomes in mammals, in yeast they have been recently postulated to act as a beneficial protein-based epigenetic mechanism and allow for rapid adaptation in challenging environmental conditions. In the budding yeast Saccharomyces cerevisiae, seven distinct prions have been discovered, including [SWI+]. This prion results from the alternative

folding of the protein Swi1, part of the SWI/SNF complex and involved in the transcriptional regulation of gene expression. In the [SWI+] conformation, yeast cells flocculate. Flocculation is the tendency of yeast cells to aggregate together, forming a multicellular mass and dropping out of suspension. To study the mechanisms that govern prion function in the cell, we are studying the interaction of [SWI+] with traditional epigenetic mechanisms. We exploited immunoblotting to compare and analyze the levels of 27 histone post-translational modifications (PTMs) in [swi-] and [SWI+] samples. Preliminary results show significant decreases in the levels of di- and tri- methylation on lysine 36 of Histone H3 (H3K36me2 and H3K36me3) in the [SWI+] samples. Future work will examine how [SWI+] results in H3K36me2/3 changes and how this change translates in alterations to the phenotype.
Support by NIH MARC.

BIOL - 206 THE UNCONVENTIONAL TRANSLOCATION OF GAPDH IN A YEAST CELL MODEL

Brianne Philippe (UG), **Iqra Bibi** (UG), Minahil Khan, Sarah Jadoo, Michael J. Cohen, Peter N. Lipke, Brooklyn College

This project focuses on how the glycolytic protein GAPDH or Glyceraldehyde-3 -Phosphate Dehydrogenase is secreted from yeast cells. It is already known that proteins exit the cell by way of the classical pathway: the endoplasmic reticulum and the Golgi body. Interestingly, GAPDH undergoes unconventional secretion, because it lacks a signal sequence. To understand how GAPDH gets to the cell surface, we screen yeast cells with mutated genes to see if those genes play a role in getting GAPDH out of the cell. To test this, yeast cultures are grown and harvested during their log phase of growth. The cells are then re-suspended in various buffers in preparation for the GAPDH assay, which allows us to view the GAPDH activity on the cell surface. Preliminary results have shown that in comparison to GAPDH activity in wild type cells, certain mutant strains such as vps8 and hsc82 have lower GAPDH activity on the cell surface. Currently we are actively screening more mutant strains against the wild type strain and observing the extracellular GAPDH activity and whether it is upregulated or downregulated. These experiments are being conducted because this GAPDH secretion, which is not fully understood, occurs in all eukaryotic cells. Put otherwise, this process also occurs in humans. So in studying this mechanism we can learn how, why and what drives this cellular response to occur.
Support by NIH MARC.

BIOL - 207 STRUCTURAL ANALYSIS OF THE VENOM PEPTIDE LHETKNOT OF LEPTOPILINA HETEROTOMA, GENERALIST PARASITOID OF DROSOPHILA, REVEALS PREVALENCE OF HEPARIN-BINDING STRUCTURAL MOTIF WITHIN KNOTTIN PROTEIN FAMILY

Joseph Arguelles[1] (UG), Shaneen M. Singh[1], Shubha Govind[2]
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The Leptopilina genus (Family Figitidae) is a parasitoid of fruit flies of the Drosophila genus. Noticeable differences in infective success of generalist species Leptopilina heterotoma (Lh) and Leptopilina boulardi (Lb), a specialist parasitoid of Drosophila melanogaster lie within the ability of Lh to suppress the host's Toll/NF-kB-mediated humoral and cellular immunity, something not observed in infections by Lb. Mixed Strategy Extracellular Vesicles (MSEVs; formerly VLPs) are thought to be necessary for infective success of members of genus Leptopilina. Analysis of MSEVs of Lh and Lb has shown notable difference both in the structure and protein components of these virulence factors. Proteomic comparison of these MSEVs identified a number of differences, including novel protein sequences and virulence-and-immunity-associated proteins. One such immunity-associated protein, the knottin-like peptide LhetKNOT, also possesses a conserved structural motif known as the Cation-Polar-Cation (CPC) Clip. The CPC Clip motif,

associated with heparin-binding peptides, has been described in literature to likely facilitate secondary antimicrobial activity in heparin-binding proteins. The Knottin family of proteins has also been shown to demonstrate antimicrobial activity to varying degrees, but the mechanism is not well understood. As Knottins are a popular target as a scaffold for drug design, a better understanding of this mechanism is likely to lead to therapies for emerging infections. Computational analysis of LhetKNOT, as well structural homologs adopting the knottin fold, has revealed the presence of the CPC Clip motif throughout all proteins evaluated, highlighting a possible mechanism for the antimicrobial activity of Knottins not previously studied.

BIOL - 208 SEASONAL CHANGES OF THE PROSPECT PARK LAKE DUCKWEED, WATER, AND SEDIMENT MICROBIOMES

Polina Ornstein[1] (UG), **Sanjar Hasanov**[1] (UG), Sevara Mallaboeva[2], Sanjar Hasanov[1], Theodore R. Muth[1]
[1]Brooklyn College
[2]Midwood High School

Duckweed is an aquatic plant that is commonly found in Brooklyn's Prospect Park and in other freshwater sites throughout New York City. When duckweed starts growing in the late spring, it is colonized by bacteria present in the water. The goal of our work is to determine how the microbiome of duckweed differs from the microbiomes of the water and the sediment. We will analyze the duckweed, water, and sediment microbiomes at 3 separate sites along the Prospect Park Lake throughout the growing season (May to October) and compare them. To determine whether or not microbial composition of the water and sediment change, and to what extent, samples were collected approximately every 3 weeks beginning in February. Colony growth on different media was observed and recorded, and DNA samples were purified for metagenomic analysis. Although there was some variability in the number of colonies, preliminary observations of the plates showed that the types of bacteria that grew were consistent across all collection dates in the winter and early spring – the most prevalent bacterial colonies were small, round, and ranged from a yellow to a white color. There was no growth observed on the MacConkey agar + Tet 15 ug/mL plates during February and early March, which suggests the absence of tetracycline resistant bacteria in the water samples collected at that time of year. Additionally, sequencing of the 5 most commonly occurring bacteria from each site confirmed the presence of Pseudomonas helleri, Pedobacter alluvionis, Bacillus wiedmannii, Chryseobacterium halperniae, and Pseudomonas azotoformans. Given the ongoing nature of the project, additional data, and samples are required to provide information on the seasonal changes in microbiomes within the Prospect Park Lake and duckweed.

BIOL - 209 ARAP1 PROTEIN CHARACTERIZATION

Dhruva Chhabra (UG), Shaneen M. Singh, Brooklyn College

ARAP1 is a notable Rho GAP protein found in eukaryotic cells. Previous scientific literature has established that ARAP1 manages the trafficking of a protein involved in apoptosis, Epidermal Growth Factor Receptor, (EGFR). By adjusting the amount of receptors on the phospholipid bilayer, the cell can control its uptake of epidermal growth factor, thereby regulating its rate of maturation. Several studies support this theory. One experiment indicates that ARAP1 inhibits the transportation of EGFR to endosomes, cellular compartments that facilitate digestion. Another project reveals that ARAP1 arrives to the cell periphery when inserting growth hormone, joining with extracellular agents in the circular dorsal ruffles. Due to its role in promoting cellular development, ARAP1 is implicated in many cancers and further investigation of this protein could yield promising clinical significance. To understand the functionality of ARAP1, we

performed a BLAST algorithm and searched for homologous structures. This data included the ARAP2 protein, which regulates focal adhesion dynamics, as well as ARAP3, which assists in stem cell regeneration and vascular proliferation. Similarly, ARAP1 also plays important roles at the cell periphery (like ARAP2) as well as stimulates physical expansion of the cell (like ARAP3). Furthermore, we analyzed the splice variants, deduced the domain archiecture, and categorized the secondary structure of the entire polypeptide chain. Afterwards, researchers modeled the tertiary structure of the PH domains, which is involved in the membrane targeting. We supplemented this information with thorough model evaluations and multiple sequence alignments.

BIOL - 210 NEUROANATOMY OF THE HABENULA CIRCUITRY AND CONNECTIVITY IN PLAINFIN MIDSHIPMAN FISH

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[2]Brooklyn College
[3]The Graduate Center of CUNY

The goal of our study is to examine the neuroanatomical circuitry and pathways to the epithalamic region of the brain, habenula, in Plainfin midshipman fish (Porichthys notatus). The habenula is widely conserved in many vertebrates and has two asymmetrical hemispheres. In mammalians, each hemisphere has medial and lateral subregions while the less complex vertebrates, such as teleost, have dorsal and ventral as corresponding subregions. Using vocal acoustic communication as a cue of perceiving and responding to aversion is widely adapted in vertebrates. It is thought to be first evolved in teleost fish. Therefore, Midshipman are the proper model which conserve the morphological and behavioral conditions to test our hypothesis. Recent studies suggest that the habenula is a modulator of serotonergic cells in the brain. Yet, the structural and functional mechanisms have not yet been fully studied. Our hypothesis is that the habenula is a junction of serotonergic cells and their neural pathway. To achieve our goal, we imbed the brains into agarose gel. Each specimen was sectioned on the frontal area to expose the habenula for the implantation of the lipophilic dye, DiI. After the incubation of the specimen, we micro-dissected the brain by Vibratome. To track the DiI traces, sections of the brain were mounted on the slide and imaged with fluorescent microscope. Our data suggests that the habenula complex is structurally connected throughout the serotonergic pathway of the brain.
Support by NSF REU Award #1757560.

BIOL - 211 DUCKWEED MICROBIOME INTERACTIONS: TRANSFER AND STABILITY IN BIOREMEDIATION APPLICATIONS

Crystal Dunkley (UG), **Ashley Civil** (UG), Benjamin Krasnyanskiy, Mendel Sero, Theodore R. Muth, Brooklyn College

This project examines the relationship between duckweed, its microbiome, and how this microbiome is maintained and transferred to uncolonized duckweed. For thousands of years, humans have used selective breeding techniques for plants and animals in order to meet the demands for an ever-growing population. The microbial communities associated with these plants and animals play a great role in their survival, be it beneficial or antagonistic. Nonetheless, the questions of the consistency and stability of these microbial communities as a function of time remains to be answered. This symbiosis of host and microbiome can be a single unit that natural selection acts on, which is then known as a holobiont. The holobiont, then subsequently the hologenome theory, was initially described through the symbiosis of coral with algae and microbes that contribute to overall development, growth, and reproduction. Duckweed is also a good example in which to study the hologenome theory, which proposes that an

organism and its microbiome are the unit on which natural selection acts. However, the specific consequences of certain bacterial communities on duckweed growth and potential remediation effects remain unknown. Using next generation sequencing of the 16S rRNA gene, we found that different concentrations of similar bacteria are associated with duckweeds from different environments. By growing axenic duckweed cultures and indirectly introducing them to duckweeds grown under environmental conditions, the association and transfer of microbiome is monitored. Additionally, the stability of such an environmental microbiome is monitored under axenic media conditions. This project will focus on how various duckweed species establish and maintain their microbiomes for bioremediation efforts.

Support by NIH MARC.

BIOL - 212 THE EFFECT OF A MICROBIOME ON THE GROWTH OF L. minor #6580 AND #7753 IN INCREASING NH4+ CONCENTRATIONS

Samia Ahmed (UG), **Tanzila Mehboob,** (UG), , Theodore R. Muth, Brooklyn College

Ammonium is often found as a pollutant in runoff water because of the use of fertilizer and waste from livestock and poultry in intensive agricultural and farming. Duckweed has the ability to grow in elevated levels of ammonium better than other plants. However, this growth is limited since too much ammonium can lead to toxicity. Our experiments study how sterile and non-sterile duckweed cultures are affected by ammonium concentrations. We hypothesized that increased ammonium concentrations will inhibit sterile duckweed growth while the addition of a microbiome will be beneficial to duckweed growth in elevated ammonium concentrations. Standard ammonium concentrations from typical growth media, in this case, the Schenk and Hildebrandt basal salt mixture (SHBS), were used as a control to compare the growth of duckweed in increasing concentrations of ammonium. Lemna minor was grown, in 5x and 10x typical ammonia concentrations. Two strains of Lemna minor, 6580 and 7753 (from the Rutgers Duckweed Stock Center), were used to test ammonium stress. Throughout the duration of 14 days, the growth of the duckweed was tracked using Image J analysis, which we used to calculates surface area of fronds. The duckweed fronds were also counted manually. At 14 days, the fronds were weighed to account for the roots of the fronds. Through these analyses, it was found that the surface area and frond count were less but the mass was more when there was more ammonium. However, the surface area, frond count and mass of the duckweed in the microbiome was more than those in the sterile duckweed. Overall, we concluded that the addition of a microbiome improves the ability of duckweed to grow in a stressful environment.

BIOL - 213 A ROLE FOR RETRACTION ATPASE PILU IN FORCE GENERATION AND DYNAMICS IN VIBRIO CHOLERAE COMPETENCE PILUS

Aleksandra Ratkiewicz[1] (UG), Anukur Dalia[2], Jenn Chlebek[2], Nicolas Biais[1], Rasman Rayyan[1], Vijay Deopersaud[1]
[1]Brooklyn College
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The Type IV pilus is a polymeric appendage shared by many bacteria. For many bacteria, it is the only way for them to interact with their environment, for nutrition, mobility, surface sensing, and taking-up DNA. Vibrio cholerae, the causative agent of the human disease cholera, harbors 3 different kind of type IV pili with different functions. Here we focus our attention on one of those type IV pili systems whose function is to take up DNA. The two main motivators for the study are to understand the functions of the ubiquitous type IV pilus in multiple species, using model organisms such as Vibrio cholerae, and ultimately provide new tools to target important human pathogens that contain the type IV pilus, such as Neisseria

gonorrhoeae, also known as the sexually transmitted disease, Gonorrhea. As in the case of many type IV pilus, the Vibrio cholerae competence pilus requires roughly fifteen proteins to be expressed. These are dynamic polymers that can undergo cycles of elongation and retraction. No less than three molecular motors have been identified by homology to be able to play crucial roles in controlling the competence pilus dynamics. Two of them, pilF and pilT, have been previously characterized respectively as the elongation and retraction ATPases. The third, pilU, hasn't been previously linked to a specific phenotype, but is genetically similar to pilT, and thus we expect that it would serve a similar function in retraction. By creating an environment of calibrated polyacrylamide gel pillars, we were able to use DIC microscopy to observe pulls, and quantify the speed and force of the pulls using ImageJ and Matlab. Through our research with varying mutant strains of Vibrio cholerae, which either lacked pilT, pilU, or both, we have deduced that the presence of the pilU gene does have significant impact on the retraction force and speed of the competence pilus opening new avenues of the mechanistic understanding of this ubiquitous bacterial appendage.

BIOL - 300 IN SILICO ANALYSIS OF THE MEMBRANE TARGETING MECHANISM OF THE PLECKSTRIN HOMOLOGY DOMAINS WITHIN THE ONCOGENIC GRB2-ASSOCIATED-BINDING PROTEIN FAMILY

Antonio Lopez[1] (GR), **Ezza Awan**[2] (UG), Areeba Zaheer[2], Shaneen M. Singh, Brooklyn College[2]
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Members of the metazoan Grb2-associated-binding (GAB) family of proteins are crucial regulatory elements of receptor tyrosine kinase (RTK) signaling pathways. All members of the GAB family contain a highly conserved, N-terminal pleckstrin homology (PH) domain that directs subcellular localization and is crucial for effective protein function. Aberrant GAB expression leads to improper growth and development, and GAB family members have been implicated as oncogenes. Recent studies suggest a direct relationship between GAB expression and tumorigenesis - inducing expression accelerated tumor proliferation and silencing expression inhibited tumor proliferation. Thus GAB proteins are potentially effective targets in cancer therapy and practical therapeutic avenues may be found in disrupting PH domain function. Unfortunately, the mechanisms of GAB membrane targeting remain to be elucidated. This study uses computer modeling techniques to predict GAB PH domain structure and function. Computational sequence analysis of the six known GAB family members (GAB1, GAB2, GAB3, GAB4, SOC1, and DOS) was used to establish intra-familiar relationships. In silico homology-based and ab initio modeling techniques were employed to propose structural models of the domains and confirm structural conservation of the fold. Models were docked with phosphoinositide head-groups to determine mechanisms of GAB PH localization. Results suggest non-specific electrostatics and interaction through specific conserved residues may be key components in GAB PH domain membrane targeting. In addition, an alternative binding pocket to the canonical binding site was proposed for some members. This study is the first step in rational design of potential therapies based on targeting GAB function via the PH domain.
Support by PSC CUNY 61298-0049.

CHEM - 102 SYNTHESIS AND CHARACTERIZATION OF A FLUORINATED ALKYL CHAIN PTERIN

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Pterins are molecules belonging to the pteridine family, a group of organic heterocyclic compounds that function as photosensitizers. Displaying a wide range of abilities, photosensitizers are molecules that produce chemical changes in other molecules when exposed to light. Scientifically, photosensitizers like pterin are important because they participate in a variety of relevant biological functions. For example, pterins can damage DNA by producing singlet oxygen, a reactive oxygen species. Much like photosensitizers, reactive oxygen species have high deleterious potential, and are notorious for disrupting basic cell function. Singlet oxygen specifically, though, has been proven to impose photooxidative damage on nucleic acids, lipids, and proteins. Here, we describe the synthesis of a new pterin derivative, namely a fluorinated alkyl chain [-CH2CH2C10F21] pterin conjugate, which is currently undergoing spectroscopic characterization. The synthesis of the fluorinated pterin involved a nucleophilic substitution (SN2) reaction for the coupling of the fluorinated alkyl chain to the O4- or N3-sites in pterin. Interestingly, an additional adduct was obtained from an N-amine condensation of dimethyformamide (DMF) solvent molecule as a byproduct. This fluorinated alkyl chain pterin is hypothesized to be soluble in fluorous media in a 2-phase system with water. An increased singlet oxygen lifetime in the fluorous phase allows it to reach the aqueous phase, separating it from the pterin sensitizer as well as other reactive oxygen species produced during the process. This study supports our ongoing work on a novel concept of fluorous biphasic photocatalysis.

CHEM - 214 NEURODEGENERATIVE PROTEINOPATHIES IN AMYOTROPHIC LATERAL SCLEROSIS ARE LINKED TO CHANGES IN HOSTONE POST-TRANSLATIONAL MODIFICATIONS

Michel Fallah (UG), Seth Bennett, Mariana P. Torrente, Brooklyn College

Neurodegenerative diseases such as Amyotrophic Lateral Sclerosis (ALS) involve the degeneration of motor neurons which leaves patients debilitated with weakened muscles and motor dysfunction. Although most cases of ALS are sporadic, familial cases account for 5-10% of ALS cases. Further complicating matters, familial ALS has been unequivocally linked to mutations in 29 different genes. Irrespective of the presence of mutations, TDP-43 and FUS form proteinaceous inclusions in affected neurons in ALS patients. Considering the epigenome, post-translational histone modifications (PTM) can provide a mechanistic explanation of the etiology of ALS, which currently has no cure. We analyze the levels of histone PTMs including methylation, phosphorylation, and acetylation. Alterations in the levels of histone PTMs cause changes in the chromatin coiling structures which in turn can influence gene expression. We aim to explore the epigenetic features of ALS in both yeast and human models through Western blot. Specifically, we focus on phosphorylation of the serine 10 residue in Histone H3 as a potential epigenetic target for ALS patients. Our results identify a distinct PTM landscape and show that epigenetic mechanisms play an important role in the development of ALS pathologies which may provide new targets for therapeutic intervention.

CHEM - 215 CONFORMATIONAL PROPENSITIES OF FXR DRUG INHIBITORS IN WATER SOLUTION

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Hypercholesterolemia is a major cause of heart disease (Handley, 2009). A potential drug therapy for hypercholesterolemia is FXR inhibition because of the role of FXR receptors in bile acid and cholesterol metabolism (Tu, 2000). Drug molecules need to often reorganize conformations to bind protein receptors. The free energy penalty of reorganization is related to how often in solution the drug molecule adopts the same conformation as in the protein. By comparing the conformations of the FXR inhibitors in an aqueous environment to the conformation of these inhibitors in the enzyme substrate complex the probable effectiveness of the inhibitor as a drug can be determined. Different force fields were used to evaluate the distribution of conformations of two FXR inhibitors in an aqueous environment in order to analyze their reorganization penalty. The results from the different force fields were compared and it was determined that there were similarities and also significant differences between the conformations the different force fields produced and the reorganization penalties associated with them.

CHEM - 216 POST-TRANSLATIONAL MODIFICATIONS IN YEAST PRION STATES

Hermena Ibrahim (UG), Samantha N. Cobos, Jailene J. Paredes, Elizaveta Son, Ominakhon Nazarzoda, Royena Tanaz, Mariana P. Torrente, Brooklyn College

Prions are infectious, self-propagating protein conformations. Prions are linked to certain mammalian diseases, specifically bovine spongiform encephalopathies and Creutzfeld-Jakob disease. However, prions have also been found to play a potentially beneficial role in yeast. Prions are able to impact cellular phenotype and allow for rapid adaptation to shifting environmental conditions. Furthermore, there is a potential association between prions and epigenetic mechanisms. In the baker's yeast S. cerevisiae, there are at least ten known prion-forming proteins. Three such proteins are Swi1, Sup35, and Rnq1. Swi1 is a unit of the SWI/SNF chromatin-remodeling complex, and its prion form is denoted [SWI+] and results in multicellular colony formation. Sup35 is a eukaryotic release factor that forms part of a translation termination complex, and its prion form is denoted [PSI+] and results in a white color for the strain, as opposed to red. Rnq1 is a protein whose biological role is unknown, and its prion form is denoted [PIN+] and results in no discernible phenotypic difference. In this study, we will investigate if yeast bearing these prions show distinct histone post-translational modification (PTM) landscapes, another form of epigenetic modification. Western blotting was used to evaluate the changes in PTM levels across different prion states. Specifically, we observe significant decreases in the Histone H3 lysine 36 di- and tri-methylation levels for [SWI+] prion while we detect increases in the Histone H3 lysine 79 monomethylation levels in the [PSI+] and [PIN+] states. Elucidating the interactions between prion states and histone modifications can shed some light on how prions result in beneficial adaptive advantages in yeast.

CHEM - 217 PHOSPHORYLATION OF HISTONE H2B IS DECREASED IN YEAST MODELS OF ALS AND PARKINSON'S DISEASE

Huda Yousuf (UG), Mariana P. Torrente, Brooklyn College

Amyotrophic Lateral Sclerosis (ALS) and Parkinson's disease (PD) cause the progressive degeneration of neurons. Thus far, no cure is available for patients diagnosed with these diseases. We aim to understand the role of epigenetics in the progression of ALS and PD. The study of epigenetics focuses on changes in an individual's phenotype without altering the genotype. Main epigenetic mechanisms involve the methylation of DNA or the modification of histone proteins. Histones are proteins around which DNA

spools. The modification - methylation, acetylation, or phosphorylation - of histones can determine which genes will be transcribed and eventually translated. Histones from yeast cells overexpressing human proteins known to be associated with ALS and Parkinson's Disease were probed for different histone modifications by western blot. We found changes in phosphorylation of histones H2A and H2B to be particularly interesting. While levels of phosphorylation of histone H2A on serine 129 has shown no changes for both ALS and PD models; phosphorylation of H2B on threonine 129 displayed a 50% decrease in phosphorylation on H2B on threonine 129 in one ALS model and a 40% decreases in phosphorylation at this site in the PD yeast model. Recent research suggests that environmental toxins, namely pentachlorobenzene and beta-methylamino-L-alanine, can lead to selective neurodegeneration. We are currently working on treating yeast cells with environmental toxins to determine if the changes seen from the ALS and PD proteinopathy models can be exacerbated.

CHEM - 301 SYNTHESIS AND CHARACTERIZATION OF Ru(II) COMPLEXES WITH π-EXPANSIVE IMIDAZOPHEN LIGANDS FOR THE PHOTOKILLING OF HUMAN LEUKEMIA AND MELANOMA CELLS

Goutam Ghosh[1] (GR), Huimin Yin[2], Susan M. A. Monro[2], Tariq Sainuddin[2], Alexander Greer[2], Sherri A. McFarland[2]

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Metal organic dyads are unique photosensitizers because of their ability to attain various excited states. A longer lifetime of their triplet intraligand excited state (3IL) makes them attractive photosensitizers. Imidazo[4,5-f] [1,10] phenanthroline (ip) is a suitable chromophore; ip can be easily linked with various organic π-expansive chromophore (-R) to obtain ip-R functional ligands. Coligand 4,4′-dimethyl-2,2′-bipyridine (4,4'-dmb) along with the functional ligand in a complex determine the photophysical and photobiological properties of that complex. Triplet excited state energy of Ru(II) complexes depends on the type of π-expansive chromophore attached to it. To evaluate the effect of π-expansive chromophore on transition state and how it influences the photobiology, seven complexes with same coligands but different functional ligands were synthesized and characterized using proton NMR, 2D 1H-1H COSY, and mass spectroscopy. A-series complexes showed a larger phototherapeutic window (phototherapeutic index) compared to C-series complexes because of their low dark toxicity compared to C-series. Few A-series complexes showed a very large phototherapeutic index (>1000) in HL-60 and SKMEL-28 cells, respectively, with no dark toxicity (EC50 >300 μM). Both A- and C-series complexes were highly photocytotoxic in SK-MEL-28 and HL-60 cell. It was found that the lower the triplet state energy of π-expansive chromophore, the higher the quantum yield of singlet oxygen for their complexes. Because of a high phototherapeutic index of these simple molecules along with room for easy structural modification of its functional ligand, this study provides the scope for designing potential phototherapeutics with suitable π-expansive chromophore unit.

Support by NIH.

CIS - 218 ANDROID MALWARE DETECTION

Aleksandr Kovalev (UG), Tzipora Halevi, Brooklyn College

Our work looks into detecting malicious Android Application utilizing different neural networks. To this end, we use the CICAndMal2017 dataset created by the Canadian Institute for Cybersecurity. We use Drebin, shared in the "DREBIN: Effective and Explainable Detection of Android Malware in Your Pocket" paper. In the original work, predictions were made based on an SVM algorithm as their classifier, by using different features extracted from the Android .apk files. The feature set examined includes Hardware components, permissions requested, app components, filtered inter-processes, restricted API calls, used permissions, suspicious API calls, and Network addresses. The android application market grows rapidly, benign and malicious applications constantly change. We propose that a neural network may be the better classifier algorithm. The original research was created around android applications that are dated between 2010-2012. We design a customized neural network, which is written in Python, using python's powerful libraries in machine learning. The neural network is trained and tested on the CICAndMal2017 dataset. In parallel, to test Drebin's longevity on newer data, we ran the original SVM algorithm on android applications dating from 2015-2018. To assess the effectiveness of both algorithms in the current android market state, we further test and compare the performance of both the newly designed algorithm and the original Drebin algorithm on a dataset of recent Android applications. We compare the results and examine which algorithm is more successful in identifying malicious android applications. We also examine the strengths and weakness of both methods of classification.

CIS - 219 DETERMINING THE ACCURACY OF CODE-SIMILARITY PROGRAMS

Joshua Nachum Sash (UG), Hui Chen, Brooklyn College

While code reuse and imitating is an effective learning strategy, it poses a challenge for computer science professors to determine if and when students have plagiarized programming assignments from other students. The goal of this study is to find an effective method for professors to determine if students have copied work from other students. It is impractical for professors to manually check all students' assignments for similar portions of code, so a program must be used. Many "code-similarity" programs have been developed and are good at finding code similarity between two submissions. But they may have flaws, such as wether these programs can effectively determine similarities between students' work even when students are allowed to use sample code. To answer this question, we first compare and identify a set of usable code-similarity tools. Second, we compare two strategies to compute code similarity between students' code: 1) we compute pair similarity between students' code; 2) we compute pair similarity of the "diffs" of students' code to the sample code base. The diffs is defined as added lines returned from source code repository tools, such as git. We applied the two strategies to submissions of ~100 students in two programming classes. The result is that the similarities exhibit a normal distribution for the first strategy and an exponential distribution for the second. Our conjecture is that the similarities of pairs of student code follow the normal distribution because the similarities are dictated by sample code while those of "diffs" indicate actual student work. We hypothesize the plagiarization happens in the long-tail of the exponential distribution. Our future work will be to examine these hypotheses and conjecture.

CIS - 302 IN SILICO MODELING OF RNA BINDING DOMAINS (RBDS) OF NUCLEOLIN AND MIRNA INTERACTIONS

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MicroRNAs (miRNA) bind to their target mRNAs playing a pivotal role in regulating gene expression. Dysregulation in miRNA biogenesis plays a central role in tumorigenesis. Nucleolin (NCL) is an RNA binding protein (RBP), often overexpressed in cancers and is an important target in cancer therapy. NCL binds to AU and G-rich regions in the coding or non-coding regions of various RNAs to regulate mRNA stability and translation or processing of ribosomal RNA (rRNA) and miRNA. NCL associates with the microprocessor complex to regulate miR-15a and miR-16 biosynthesis. NCL modulates miR-21, miR-222, miR-221 levels leading to breast cancer cell aggressiveness and drug resistance or increases in levels of stress-regulated miR-16, miR-21 and miR-103. The list of miRNA regulated by NCL is constantly increasing, yet the mechanism of miRNA- NCL interaction remains unknown. We hypothesize that NCL RBDs 3-4 drive the miRNA-NCL interactions. Currently only partial structural information available for NCL. We will test our hypothesis based on modeled structures of RBD 1-4 and RBD3-4 in tandem. We will use available miRNA structures on PDB and miRNA databases and modeled the yet unknown. We will use known miRNA interactors of NCL to investigate the RNA binding domains specificity in NCL-RBDs using docking tools specialized for predicting protein-nucleic acid complexes. Our preliminary in silico modeling strongly suggest the importance of RNA recognition motifs in RBD 3 and 4 domains in NCL-miRNA interactions. The proposed computational analysis will lay the groundwork to elaborate the mechanism of miRNA-NCL binding and specificity in these interactions.
Support by DSRG round 14.

EES - 103 PHYTOREMEDIATION ON HEAVY METAL CONTAMINATED SOILS USING BRASSICA JUNCEA

Humayara Karim[1] (HS), **Andrew Kobrin**[1] (HS), Yenny Huang[1], Zhongqi Cheng[2]
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Soil is the foundation of agricultural productivity and water quality. Heavy metal contamination in urban soils also poses a substantial threat to human and environmental health. A method to remove heavy metals from soils is phytoremediation, the use of selected plants to uptake and thus clean contaminated soils. A common species that are used for phytoremediation of many metals is a brown mustard plant, Brassica Juncea. The objective of this study is to determine if Brassica Juncea can reduce the amount of lead and arsenic found in soils. In this experiment, we used five soil samples with low Pb & As, high Pb & As, high Pb only, natural soil with no Pb or As, and sand (no Pb or As) to test if the plants can successfully uptake heavy metals. Four pots were planted for each of the five soils and were grown for 3 months. Pb and As concentrations were analyzed for both the soils and plant tissues. It was expected that the Brassica Juncea would be successful in uptaking all the heavy metals present in the soils samples. However, the results show that it was not capable of uptaking lead or arsenic, but it managed to uptake large quantities of zinc. This means the plants can help reduce zinc contamination in soil.

EES - 104 ANALYZING THE IMPACT OF DENDROBAENA VENETA EARTHWORMS ON THE BIOAVAILABILITY OF HEAVY METALS IN SOIL

Amy Chen[1] (HS), **Susana Tzunun**[1] (HS), Zhongqi Cheng[2]
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While the sun, oxygen, and water are indeed necessities for human survival, soil, which is a homogenous mixture of different substances like water and organic matter, is an unsung hero in terms of human sustenance. The health of soil, plays an essential role in growing healthy plants and storing/filtering water which then provides humans and animals access to healthier food and freshwater. With the rise of agriculture in urban areas, soil pollution, mainly heavy metal contamination, poses a threat to human health. Existing soil remediation strategies are extremely expensive and unhealthy. This project aims to develop an improved method of cleaning soils that is inexpensive and eco-friendly using Dendrobaena Veneta earthworms. In this study, Dendrobaena Veneta worms were placed into different soils collected from an urban community garden which had different levels of contamination (Pb and As). We then analyzed their effect on bioavailability of heavy metals. Our results showed that the earthworms did decrease the levels of metals in the soils. We found that the earthworms tended to prefer loamy soil and this may due to the fact they are able to breathe and move easily. In conclusion, we believe that this could be an eco-friendly and inexpensive solution to cleaning urban soils. For further works we would suggest scientists to increase the sample size of worms and test these methods on different species of earthworms.

EES - 220 THE PRESENCE OF MICROPLASTICS IN HUDSON RIVER PARK'S ESTUARINE SANCTUARY, NYC

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Microplastics are an emerging issue that has gained increased attention by the scientific community due to the global impact of plastics in the ocean. Since 2016, Hudson River Park has collaborated with Brooklyn College to conduct a survey that investigates the concentration and distribution of microplastics that are

<5mm in size, in Hudson River Park's estuarine sanctuary with in the area of Chambers Street to 59th Street in New York City. This ongoing monitoring project has developed a baseline understanding of the presence of microplastics in the Hudson Estuary. Hudson River Park's Estuary Lab conducts this survey by trawling a Neuston net at channel and near shore locations as well as counting and categorizing the debris types found in the sample through microscopic analysis. Statistical analyses revealed that microplastic concentrations in 2016, 2017, and 2018 are significantly different (ANOVA, $p<0.001$). Further data analysis suggests that the significant differences may be representative of varying wet weather conditions during the each year's sampling season. The comparison of microplastic concentration across all three years has given rise to new research questions related to weather fluctuations, collection methods, tidal influences, and the proximity to combined sewage out flow. Future surveys following the 2019 Styrofoam ban in New York City and other discharge reduction measures will assess the effectiveness of these measures.

EES - 303 CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS AND HEAVY METALS IN URBAN SOIL AND HISTORIC LANDFILL AREAS IN NEW YORK CITY

Raphael Rosenbaum[1] (GR), Zhongqi Cheng[2], Brianne Smith[2], Peter M. Groffman[2], Richard Shaw[2]
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Historic fill materials are often associated with contaminants such as polycyclic aromatic hydrocarbons (PAHs), lead and other heavy metals. The New York State Department of Environmental Conservation has mapped the extents of historic landfills, which constitute 23% of the area of New York City, but these extents are approximate and these concentrations are compared to background levels found in rural areas of New York State rather than those in New York City. In this project available data from over 500 voluntary cleanup site investigations through the New York City Office of Environmental Remediation is compiled into a comprehensive dataset. The results will be statistically evaluated using significance testing to determine the correlation between contaminant concentration, proximity to historic landfills, depth below grade, distance to a roadway, and the presence of fill material. The results will be incorporated into a GIS mapping tool to depict the spatial relationship of the dataset relative to the location of historic landfills. The results can be used to establish background concentrations of common soil contaminants in urban soil in New York City, identify areas of elevated exposure risk, and inform revision of soil cleanup standards in urban areas.

EES - 304 ANDES ETHNOPEDOLOGY KNOWLEDGE: A SOIL MICROBIAL QUALITY AND SOCIETAL MANAGEMENT HOLISTIC ANALYSES OF INDIGENOUS POSTCOLONIAL FARMLANDS, ECUADOR

Katharhy G[1] (GR), Peter M. Groffman[2], Kiyoka Koizumi[2]
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Agroecosystem soil health studies are essential sources of knowledge for the design of sustainable agriculture systems and case-based land management methodologies. Andes native peoples' connection, philosophy, perception, and land administration are attitudes of soil culture which provides a path to regenerative agroecosystem management. This research hypothesized that microbial biomasses of heritage farms would differ from those in commercial farms due to the influences of societal soil culture knowledge. We conducted soil microbial tests using microBIOMETER and semi-constructed surveys/interviews in two highland farmer communities, northern Ecuador. Our holistic qualitative and quantitative assessment of soil microbiology and surveys data (heritage soils, rapidly declining) and (intensive soils, becoming dominant) highlights correlations between microbial abundance to crop quality, yield, and ethnopedology knowledge. Preliminary results indicated heritage soils to contain high microbial

biomass, good crop quality and yield, while intensive soils showed declining microbial numbers, significant low crop quality and yield. These differences seemed to be connected to soil culture administration. Moreover, findings apply to the innovation of efficient urban and rural regenerative agriculture management. Also, it suggests further research on soil culture connecting to how soil health is an instrument to construct resilient agroecosystems in the age of climate change crisis.
Support by The Tow Foundation and microBIOMETER.

EES - 305 MITIGATION OF SEPTIC EFFLUENT NITROGEN USING HYBRID GREEN INFRASTRUCTURE FOR THE MANAGEMENT OF HARMFUL ALGAL BLOOM PRODUCTION IN LONG ISLAND COASTAL WATERS

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This research evaluates the potential of a smart-sensored hybrid green infrastructure system (ecoWEIR) for reducing nutrient loading from septic systems and thus offseting harmful algal bloom (HAB) growth in coastal waters. In Suffolk County, NY, septic systems treat 70% of the domestic waste and nitrogen release from these systems as nitrate has been identified as a leading cause for degraded coastal water quality in Long Island coastal waters and an important factor contributing to outbreaks of HABs in the Great South Bay. Green infrastructure has been gaining recognition as a cost-effective decentralized management approach for mitigating stormwater related nutrient loading into waterways and may have the potential to address septic leaching as well. For this research we compared nutrient removal efficiency from daily septic outflows treated with basic drip irrigation into a drain field (experimental control) vs ecoWEIR augmented GI (72-hour retention). Results from this research demonstrated 99% removal for both total nitrogen (TN) and phosphate (P) for the ecoWEIR treated septic effluent vs 96% TN and 61% P removal in the basic drip irrigation experimental control treatment. Septic effluent nitrate-nitrogen is being targeted for removal by policy makers and coastal managers to offset HAB events in Long Island's coastal waters. In coastal waters not impacted by septic seepage, groundwater discharge concentrations of nitrate are on average about 63µM. In contrast, the nitrate concentrations in the outflow of the experimental basic drip irrigation treatment was 254µM whereas the average nitrate in the ecoWEIR treatment was only 52µM. The ecoWEIR technology is shown to reduce septic nitrate-nitrogen flows within natural freshwater and coastal water concentrations.
Support by NOAA CREST.

HNS - 221 DETERMINING THE POTENTIAL DIFFERENCES IN HEART RATE RECOVERY BY ONSET OF OBESITY

Sarah M. Ustoyev (UG), Kristie Rupp, Brooklyn College

Heart rate recovery (HRR), the degree to which heart rate returns towards resting after exercise, is slower in adults with obesity due to a blunted autonomic nervous system (ANS) response. The purpose of this study was to determine whether there is a difference in HRR within the first two minutes after a submaximal exercise test by onset of obesity. Participants (N=62) were sedentary (<60 minutes self-reported physical activity per week) adults (aged 32.3 ± 11.4 years) classified as overweight or obese (body mass index 33.6 ± 3.9), who participated in a submaximal exercise test to 85% of their age-predicted maximal heart rate (HR) as part of their study assessments. Onset of obesity was determined by a weight history questionnaire. Participants who indicated the presence of obesity between the ages of 15-18 years old were classified as juvenile onset (JO), participants who indicated onset after 18 years were categorized as adult onset (AO). HRR at minute one and two were calculated by subtracting the respective HR measured during recovery from peak HR. To examine differences by the onset group in HRR at minute one and minute two, separate multiple regression models, adjusted for age, gender and fitness level, were utilized. There were no significant differences in HRR between JO and AO groups at minute one [(22.3 (19.0, 25.7) bpm vs (23.9 (20.5, 20.5) bpm; mean (95% confidence interval); p= 0.56]; or minute two [(36.7 (33.3, 40.1) bpm vs 39.2 (35.8, 42.6) bpm; p=0.35]. There were no significant differences between JO and AO groups with respect to insufficient heart rate recovery (p =0.69). There does not appear to be a difference in HRR by onset of obesity.

Support by PSC-CUNY Award # 60834-00 48.

HNS - 222 THE EFFECT OF CHOLINE ON DNA METHYLATION IN THE HIPPOCAMPUS OF THE OFFSPRING OF GESTATIONAL DIABETES (GDM) MICE

Kaydine A. P. Edwards[1] (UG), Hunter W. Korsmo[2], Xinyin Jiang[1]
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DNA Methylation is an epigenetic modification that changes the expression of genes without altering the genomic sequence. Maternal nutrition exposures and health status, such as maternal overnutrition and gestational diabetes mellitus (GDM), have permanent influence on DNA methylation of offspring. Choline is a water-soluble vitamin-like nutrient that is essential for healthy brain development and provides the methyl group for DNA methylation. The objective of this project is to determine the effects of choline supplementation on DNA methylation in the hippocampus of the offspring from mouse dams with GDM. In this study, female mice were divided into four groups: high fat (HF) feeding (to induce GDM), HF with choline supplementation, normal fat (NF) control and NF with choline supplementation. The experimental groups followed their diets and supplements for 4 weeks before timed-mating and throughout gestation. Thereafter, they were fed the NF diet during lactation. After weaning, the offspring were fed the HF diet for 6 weeks before dissection. Brain hippocampus was then dissected for DNA extraction and global DNA methylation analysis. Global DNA methylation was increased in the NF choline supplemented group versus the NF control group (P = 0.056); however, there were no differences between the HF choline versus the HF or NF control groups (P = 0.992). In summary, there was an interaction between maternal HF feeding and choline supplementation in influencing global DNA methylation. Maternal HF feeding eliminated the increase in offspring hippocampal DNA methylation by choline supplementation observed under the NF feeding condition.

Support by NIH MARC award GM008078.

HNS - 223 ASSOCIATIONS OF SUBSTANCE USE AND SEXUAL BEHAVIOR WITH PERCEIVED GENERATIONAL CHANGES IN SOCIAL NORMS

Anika Raihan (UG), **Nelsia K. Marquis** (UG), Claudine Guerra, Enrique R. Pouget

Social norms and attitudes regarding substance use and sexual behavior can change over time for reasons that are not well understood. Younger people sometimes reject proscriptive norms of older generations and engage in behavior that puts them at risk for overdose, and incident HIV and hepatitis C infection. Other times, younger people learn to avoid risks that negatively affected previous generations. Intergenerational disjuncture (IGD) represents the degree to which individuals reject norms of generations younger or older than themselves. As part of a larger study, we developed measures of IGD for younger (IGD-Y) and older (IGD-O) adults based on survey responses, achieving acceptable levels of reliability and criterion-based validity. The goal of this study was to analyze data from people at risk for overdose and HIV and hepatitis C infection to determine to what extent social norms transference across generations may affect or serve as an indicator for individual risk behaviors. Among 300 people who inject drugs (PWID), IGD-Y was significantly associated with misusing prescription opioids and tranquilizers, binge drinking and more frequently using venues to find sex partners, and IGD-O was associated with less use of tobacco and older age. Among 256 men-who-have-sex-with-men (MSM) IGD-Y was associated with having unprotected sex with casual partners, and using synthetic cannabis, methamphetamine and crack, but less frequently injecting drugs. IGD-O was associated with less unprotected sex, less use of methamphetamine and older age. Future research is needed to determine whether IGD measures serve merely as indicators of risk, or reflect a norms-based behavioral change mechanism that can partly explain changes in behavioral risks over time.
Support by R01DA031597.

HNS - 224 PERCEPTION OF WEIGHT BY RACE/ETHNICITY IN ADULTS WITH OVERWEIGHT OR OBESITY

Marina Mekhail (UG), Kristie Rupp, Brooklyn College

The relationship between race/ethnicity and self-perception of weight among sedentary adults with overweight or obesity is not well understood. The purpose of this study was to determine if self-perception of weight differs by race/ethnicity among sedentary adults with overweight and obesity. Participants (N=63) were 68.3% female; age (32 .1± 11.4 years; mean ± sd); with a body mass index (BMI) of 33.6 ± 3.8 kg/m2. Participants completed a weight history questionnaire, which asked how they viewed their current weight status compared to most people their age. Participants were subsequently grouped into three categories based on their weight perception: (1) Thinner than most or normal weight; (2) A little heavier than most; and (3) Much heavier than most or one of the heaviest. Race/ethnicity was grouped into three categories: (1) Hispanic/other (including biracial); (2) non-Hispanic white; (3) non-Hispanic black. Logistic regression models, adjusted for age, education, and gender, assessed the odds of the weight perception outcome comparing non-Hispanic white to non-Hispanic black and Hispanic/other (including biracial) participants. Participants were 36.5% Hispanic/other (including biracial), 42.9% non-Hispanic white, and 20.6% non-Hispanic black. Compared to non-Hispanic white participants, non-Hispanic black and Hispanic/ other (including biracial) participants did not have significantly different odds of perceiving themselves as: (1) thinner than most/normal weight; or (2) much heavier than most or one of the heaviest (p's >0.05). There does not appear to be differences in perception of weight status by race/ethnicity in adults with overweight and obesity, however, further investigation is warranted.
Support by PSC-CUNY Award # 60834-00 48.

HNS - 225 OPIOID USE TRENDS AMONG WHITE, BLACK AND LATINX ENTRANTS TO SUBSTANCE USE TREATMENT PROGRAMS, 1992-2016

Mariam Tsurtsumia (UG), **Mathew C. Scott,** (UG), Enrique R. Pouget, Brooklyn College

While the increasing overall prevalence of fatal overdose associated with increased rates of prescription opioid (PO) misuse and heroin use in the US has been well documented, less is known about racial/ethnic minority groups. Black and Latinx people who use opioids (PWUO) may have been relatively less impacted by increased opiod prescribing for non-cancer pain during the 1990s and 2000s than non-Latinx White PWUO. This is significant because the effectiveness of drug treatment is lower and the risk of overdose is greater for individuals who use heroin. In order to better understand changing opioid use trends and improve overdose and infectious disease prevention it is crucial to determine whether these trends are reflected across racial/ethnic groups. We examined data from required reporting in the Treatment Entry Data Series (TEDS) from 1992 to 2016 to compare the proportions of patients entering substance use treatment facilitates who used 1) heroin only, 2) POs only, and 3) both heroin and POs. The overall trend of increasing prevalence of PO-only use until 2011 (when PO-only prevalence was 42%), and then declining prevalence through 2016 (when PO-only prevalence was 25%), is reflected among the data for non-Latinx White PWUO. However, among Black and Latinx PWUO the trend is more muted, with a high in PO-only prevalence of only 18% during 2011. In addition, there was a dramatic increase in PO-only prevalence in the most recent year of data availability. Overall trends of PO misuse and heroin use may obscure trends for racial/ethnic minority groups. Previously low rates of PO misuse among Non-Latinx Black and Latinx PWUO may be increasing. Further research is needed to determine whether these trends are consistent across treatment modalities and geographic regions.

HNS - 226 PREDICTING CHANGE IN FITNESS THROUGH SELF-REPORTED ACTIVITY.

Sherie Alexis (UG), Kristie Rupp, Brooklyn College

Regular physical activity during behavioural weight loss intervention (BWLI) contributes to improvements in fitness; however, it is unknown whether average physical activity across a standard BWLI or the second half of the intervention, better predicts change in fitness. The purpose of this study is to determine the association between change in fitness and the average of self- reported physical activity over six months and the last three months of a BWLI. Sixteen participants were 93.8% female, age (30.8±10.7 years; mean ± sd) and had a body mass index (BMI) of 34.1 ± 3.1kg/m^2. Fitness was measured as time to 85% of age-predicted heart rate maximum (HRmax) during an exercise test, at baseline and after a six-month BWLI. Change in fitness was computed as the difference between the final and baseline assessments in time to 85% of HRmax. Participants reported physical activity minutes in weekly dairies throughout the 26-week intervention. The average across the 26 weeks and the last 13 weeks were computed using statistical analysis. Bivariate correlation was used to determine the association between change in fitness and average self- reported physical activity across 26 weeks and the last 13 weeks of the BWLI. There were no significant associations between self- reported physical activity over 6 months ($r = 0.358$; $p = 0.19$) or the last 3 months ($r = 0.364$; $p = 0.20$) of the BWLI and change in fitness. While the association between self-reported average physical activity over 6 months and the last 3 months of the BWLI and change in fitness were not significant, they are similar in magnitude suggesting no difference in prediction.

Support by PSC-CUNY Award # 60834-00 48.

HNS - 227 MOUSE MODEL OF NON-ALCOHOLIC FATTY LIVER DISEASE

Kristy St.Rose (UG), **Hoda Tantawi** (UG), Jorge M. Caviglia,

Non-alcoholic fatty liver disease (NAFLD), is the most common liver disease, affecting 25% of the US population and 90% of individuals with obesity. Progression of NAFLD leads to liver fibrosis, cirrhosis, and cancer. The mechanisms of progression are not well understood, in part due to the lack of good experimental models. To develop a better model of NAFLD, we hypothesized that mice overeating a Western-type diet would develop metabolic and hepatic alterations similar to those in humans with NAFLD. We fed hyperphagic Ay mice a Western-type diet high in fat and fructose (HFF), which included solid food containing milk fat and sucrose, and drinking water with high-fructose corn syrup (HFF diet). We (1) assessed obesity by measuring body weight and composition, (2) determined liver fat accumulation and fibrosis by histology, and (3) analyzed their gut microbiota by 16S rRNA metagenomics. Ay mice that were fed the HFF diet became obese, developed fatty liver and liver fibrosis, and showed alterations in their gut microbiota similar to those described in human NAFLD. Therefore, this animal model replicates the most important alterations found in humans with NAFLD and proves to be a good model to study NAFLD.

HNS - 306 MATERNAL CHOLINE SUPPLEMENTATION DURING GESTATIONAL DIABETES CAUSES LONG-TERM PHENOTYPIC CHANGES IN OFFSPRING

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Using a mouse gestational diabetes mellitus (GDM) model, this study investigated whether maternal choline supplementation (MCS) could alter postnatal growth and metabolic abnormalities associated with GDM. C57BL/6 mice were either fed a low fat (LF, 10kcal % fat) control diet or a high fat (HF, 60kcal % fat) diet prior to and during pregnancy to induce GDM. These mice received either 25mM choline (MCS) or plain drinking water. After weaning, offspring were fed the HF diet for 6 weeks before glucose tolerance testing and dissection. In male offspring from MCS-GDM mothers, we observed a decrease in fasting blood glucose levels and an increase in glucose tolerance when comparing to other groups ($P < 0.05$). Liver choline metabolite measurements demonstrated that free choline content was lower ($P = 0.01$) in the MCS-GDM male offspring than control GDM male offspring; there is also an increase in liver sphingomyelin concentrations ($P = 0.007$) in female offspring from MCS-GDM compared to control GDM dams. MCS during GDM leads to improvements in blood glucose control in male mouse offspring exposed to a postnatal HF environment.

Support by NIGMS and NIDDK; New York Academy of Sciences.

HNS - 307 DIFFERENCES IN PERCENT WEIGHT LOSS BY SELF-WEIGH FREQUENCY

Cathleen Janeczko (GR), The Graduate Center of CUNY, Kristie Rupp, Brooklyn College

It is not well understood whether regular self-weighing (≥ 1x/wk) elicits greater initial weight loss (first 6-months) in comparison to those who self-weigh less frequently (<1x/wk) during a standard behavioral weight loss intervention. The purpose of this study was to determine whether there is a difference in percent weight loss between those who reported regular self-weighing (≥ 1x/wk) and those who did not report regular self-weighing (<1x/wk) during a 6-month standard behavioral weight loss intervention. Participants (N=16) were 93.8% female, age 30.8 ± 10.9 years, with a BMI of 34.1 ± 3.1 kg/m², enrolled in a 6-month standard behavioral weight loss intervention. Participants were also encouraged to weigh

themselves regularly and were provided a spot on the weekly food and exercise diaries to record their weight. Weekly frequency of self-weighing was computed as the total number of reported self-weigh days divided by the number of completed diaries. Subsequently, self-weighing frequency was split into 2 categories; regular self-weighing (≥ 1x/wk) and those who did not report regular self-weighing (<1x/wk). Percentage of weight loss was calculated as the difference between final and baseline body weight divided by baseline weight. Percentage of weight loss did not differ significantly between less frequent and more frequent self-weighing (means ± sd; -5.9 ± 6.1 vs. -12.2 ± 7.2 ; p = .083), respectively. However, there was a significant difference between groups with respect to change in BMI (-1.7±2.0 vs. -4.7±2.7; p= .024). While not significant, the trend towards significance suggests self-weighing at least once per week is associated with greater initial weight loss and further investigation is warranted.

Support by PSC-CUNY Award # 60834-0048.

PHYS - 105 DEVELOPMENT OF A HIGH-PRESSURE SAMPLE CELL FOR AC IMPEDANCE SPECTROSCOPY MEASUREMENTS OF ELECTROLYTES

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One of the key transport parameters used to screen electrolytes for applications in electrochemical energy storage and conversion devices is the ionic conductivity. Generally, measurements are determined as a function of temperature, which can provide information about the thermally activated ion mobility. However, measurements as a function of pressure can provide more important information about the effect of density on the ion-ion interactions in the material, which can correlate with the ions' mobilities and the materials' resulting transport properties. To provide variable pressure conductivity measurements of electrolytes, we have designed a high pressure chamber that's chemically inert. We will show the steps took to develop our cell.

PHYS - 106 EFFECT OF CONCENTRATION AND TEMPERATURE ON THE CHARGE TRANSPORT OF ALCL3 - AMIDE IONIC LIQUID ANALOGUES

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Consumers rely on lithium ion batteries for many everyday applications. However, due to factors such as cost, safety and depletion of natural resources, alternative ion batteries are needed. One possibility is the aluminum ion battery (AIB) due to Al's three-electron exchange capability, favorable energy density and cost. One of the impediments facing AIBs is a lack of optimized electrolytes. In an effort to advance the development of AIBs we have embarked on a fundamental characterization of the ion-ion interactions that affect the electrolytes performance and therefore optimization. We will present variable temperature and concentration ionic conductivity data for mixtures of AlCl 3 -amides (urea, propionamide, butyramide and acetamide) as part of our comprehensive study of the short- and long-range ion-ion interactions and their transports. Conclusion of our study will yield the important parameters that affect optimization of the electrolytes.

PHYS - 230 HOW ELECTRICITY PRODUCTION IN AMERICA IS CHANGING

Daniel Kruglyak (UG), **Kyle M. O'Carroll** (UG), Vikash Tewari, Micha Tomkiewicz, Brooklyn College

The goal of this study is to evaluate electric efficiency nationwide and to examine how different forms of energy are used to produce electricity. Electrical efficiency will be calculated as electricity generation versus GDP. Another area being covered is how the source of energy used to create electricity has changed. Graphing these values over time will determine the trend for whether America is becoming more or less efficient as well as how the electricity produced carbon footprint has changed over time. There is a crucial disparity between energy and electricity which is not recognized in public discourse. The goal of this research is to explain that multifarious energy sources are used with varying success in order to produce electricity. We will examine how the use of different energy sources has changed over time and in particular how these different methods vary in their effect on the global climate. If America will implement renewable energy generation for the production of electricity, moving away from

nonrenewable sources, then our nation will aid in decreasing the global temperature increase to an amount closer to the goal set by the United Nations.

PHYS - 231 CARBON TAX

Anelisa Defoe (UG), Nataly Azouly, Micha Tomkiewicz, Brooklyn College

Approximately 82% of greenhouse gases emissions in the U.S are a result of the burning of oil, coal, and natural gas. The objective of this research is to determine the effectiveness of a carbon tax to mitigate the use of fossil fuels and reduce carbon emissions. Through observation of countries with successful carbon tax policies, current legislation concerning fossil fuel production and consumption, and statistical analysis, it will be determined that implementing a carbon is an effective tool in mitigating carbon emission by demonstrating that there exists an inverse relationship between the price of fossil fuels and its consumption. Our analysis shows that carbon tax is an effective method to mitigate the use of fossil fuels. Carbon tax raises the issue of what to do with the tax revenue raised by this new policy. Proposals have included issuing a rebate, investing in clean energy technology, and using these funds to decrease the U.S. government's deficit. We determined that the best uses for the revenue generated from a carbon tax should be used to offer a rebate to lower and middle class individuals and to invest in researching new technology in clean and renewable energy in order decrease the costs of renewable energy sources and methods.

PHYS - 232 HOW INCOME INEQUALITY CORRELATES WITH CO2 EMISSIONS AND WHAT CAN WE DO ABOUT IT?

Quinn Downes (UG), Michael Guerin, Benjamin Krasnyanskiy, Micha Tomkiewicz, Brooklyn College

Recent developments in the world's environmental, political, and economic atmospheres have made climate change and the global widening income gap dominant topics of discussion. More of the world's wealth is coming into the possession of fewer people and the majority of the population possesses less wealth. It is, therefore, unsurprising that there have been numerous studies done to explore how income distribution affects carbon emissions . For example, total CO_2 emissions of a nation is examined alongside lognormally distributed income distribution statistics. In this study, data was analyzed to determine if economic inequality prevalence throughout a country leads to increased carbon dioxide release as a result of excessive transport. The analysis in this work is focused on transportation. Examining this data along with global Gini coefficient statistics, the empirical results of analysis indicate a positive correlation between a nation's Gini coefficient and the anthropogenic CO_2 emissions from methods of transportation. With these results, policymakers will have more insight, enabling them to make informed decisions when approaching these matters. Particularly, these findings will guide policymakers into realizing that increased income equality is a possible remedy for high CO_2 emissions.

PHYS - 233 DETERMINATION OF THE RELIABILITY OF A CALORIMETRIC PUCK-BASED METHOD FOR DIRECT ADIABATIC TEMPERATURE CHANGE MEASUREMENTS

Benjamin Krasnyanskiy (UG), Evan Biegel, Karl G. Sandeman, Brooklyn College

The magnetocaloric effect is the change in temperature of a magnetic material induced by an applied magnetic field. Due to this property, magnetic solids have great potential for use in applications such as efficient home refrigeration. However, to attain high cooling efficiency it is necessary to determine which magnetocaloric materials exhibit the greatest adiabatic temperature change, ΔTad, as a function of field change. Here, a puck-based method adapted to a Quantum Design (QD) Physical Property Measuring

System (PPMS®) is implemented to measure ΔTad, with a recent report published by QD suggesting that this method as feasible. Although most laboratories throughout the world employ indirect measurements of field-induced entropy change to compare magnetocaloric materials, direct caloric measurements of the kind explored here are required to provide full characterization of the usefulness of any potential magnetic refrigerant. Given that there are 1000 PPMS® apparatus available throughout the United States alone, the technique that we are exploring can be exploited by many research groups in the future. This study focuses on building our own puck-based ΔTad measurement apparatus and comparing attained results to published ΔTad measurements obtained by other methods, both direct and indirect, to assess the reliability of this approach. Analysis of a LaFeCoSi sample demonstrates promise for the reliability of this method.

PHYS - 234 CARBON AND ENERGY INTENSITIES IN THE US

Junfeng Lu (UG), **Haosheng Chen** (UG), Amged Haimed, Micha Tomkiewicz, Brooklyn College

The United States is one of the developed countries with high carbon use in the world, and its GDP is high in the world. The country's carbon emission, energy consumption, and GDP are closely related. The project studied the intrinsic link between carbon and energy intensity and GDP. For each of the states in the US, the greater the carbon and energy used, the higher the state's GDP should be, and the greater energy intensity is. For the purpose of confirming the point that the use of carbon and energy would help GDP grow, the CO2 emission, total energy consumed, and the GDP of each state were collected. These sets of data were processed into a bar data table and linear data table for comparison. From the collection and comparison of data, when the state used more carbon and energy, its GDP was at a high level. So, the use of carbon and energy would increase GDP, and they were proportional, and the energy intensity would also increase. In order to more clearly understand how energy help state GDP growth, sample states will be given, as well as the impact of residential, commercial, industrial, and transport status on the growth of states' GDP. To a certain extent, energy intensity reflected the efficiency of energy use per unit of GDP; therefore, the study on GDP and energy intensity of each state in the US could make more efficient use of energy and produce higher economic effects in unit energy.

PHYS - 308 DEEP UV PHOTOLUMINESCENCE STUDIES OF MESOSCOPIC ZNO PARTICLES

Nikesh Maharjan (GR), The Graduate Center of CUNY, Mim Nakarmi, Brooklyn College

Mesoscopic Zinc oxide particles annealed at 550 and 650 oC for 2 hours have been investigated for structural and optical properties. The samples were characterized by x-ray diffraction and scanning electron microscopy for structural properties. Deep UV photoluminescence (PL) spectroscopy was employed to study the optical properties using the third harmonic laser (260 nm) generated from a Ti: sapphire laser for optical excitation. PL spectrum measured at low temperature has dominant emission peak at around 3.308 eV due to the transitions of free electrons from conduction band to holes bound to acceptor state along with longitudinal optical phonon replicas. It also revealed excitonic emissions at 3.359 and 3.371 eV due to donor bound exciton and free exciton transitions respectively. From the excitation power dependent PL measurement at low temperature, we observed the localization of excitons in these samples. Temperature dependent optical properties and possible origin of the excitons localization will be presented.

PHYS - 309 THE USE OF MAGNETICALLY HARD MATERIALS IN THERMOMAGNETIC POWER GENERATION CYCLES FOR ENERGY RECOVERY

Anthony N. Tantillo[1] (GR), Karl G. Sandeman[2], Dominique Givord[3], Laurent Ranno[3], Nora Dempsey[3]
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Thermomagnetic power generation (TMG) is the process by which magnetic flux, which comes from a temperature-driven change of magnetization, is converted into usable energy. TMG often uses magnetically soft materials, which have no magnetization (M) at zero applied field (H) and magnetize in the direction of the applied field, limiting TMG loops to the first quadrant of the M-H plane. This work investigates the ways in which magnetically hard materials, which have strong magnetic anisotropy and finite magnetization at zero applied field, can be incorporated into TMG cycles. Three cases were considered: hard ferrite magnets as the functional material for a two-quadrant TMG cycle; a "bias" field from a hard magnet next to a soft material, thus opening the second quadrant of the M-H plane; and spin-reorientation transition (SRT) TMG, in which a change of the direction of the magnetization vector (instead of a decrease in the magnitude of the magnetization) drives the observed magnetic flux. It has been found that commercially available hard ferrites are not ideal TMG functional materials, but optimizing thermal properties could develop materials which compete with today's top soft TMG materials. Computational results indicate that "biasing" a soft magnet with a hard magnet is essentially equivalent to "shifting" the M-H loop by an amount proportional to the field of the biasing magnet. This would greatly increase the work output of devices, but experimental verification is needed. Finally, the literature shows that SRT TMG yields work outputs an order of magnitude greater than pyromagnetic TMG, with roughly equal relative efficiencies.

PHYS - 310 GIANT BAROCALORIC EFFECT AT THE SPIN CROSSOVER TRANSITION OF A MOLECULAR CRYSTAL

Steven Vallone[1] (GR), Anthony N. Tantillo[1], António M. dos Santos[2], Jamie J. Molaison[2], Malcolm A. Halcrow[3], Antonin Chapoy[4], Karl G. Sandeman[5]
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Caloric cooling is the name given to the use of a caloric refrigerant that can be driven between two states of entropy by means of a field conjugate to the order parameter, resulting in an isothermal entropy change associated with a sharply temperature-dependent order parameter. Examples of these caloric phenomena include the magnetocaloric effect, which results from magnetic field-driven changes in magnetization, and the electrocaloric effect, which occurs when an electric field causes changes in electric polarization. Caloric refrigerants are typically solids whose research is motivated by the opportunity to reduce the global warming effects associated with volatile gas refrigerants and by the potential for refrigeration devices to be more efficient. To this end, caloric research tends to focus on material properties at or near room temperature. We provide the first experimental evidence for a giant, conventional barocaloric effect associated with a pressure-driven spin crossover transition near room temperature. We use magnetometry, neutron scattering and calorimetry to explore the pressure dependence of the SCO phase transition in polycrystalline samples of protonated and partially deuterated

SCO materials in pressures of up to 120 MPa. Our data indicate that, in a pressure change of only 30 MPa, an adiabatic temperature change of 3 K is observed at 262 K or 257 K in the protonated and deuterated materials, respectively. This is equivalent to the magnetocaloric effect observed in gadolinium in a magnetic field change of 0-1 Tesla. Our work confirms predictions that giant, conventional BCEs will be found in a wide range of SCO compounds and points toward the potential use of barocaloric materials as part of eco-friendly, solid-state cooling applications.

PSYC - 107 MONK PARAKEETS (MYIOPSITTA MONACHUS) PREFER TO NEST IN GREENSPACE IN NEW YORK CITY COMPARED TO OTHER TYPES OF LAND

Annabel Xie (HS), Midwood High School, Frank W. Grasso, Brooklyn College

Monk parakeets (Myiopsitta monachus) are viewed by many people in urban settings as a noise nuisance; an important source of noise pollution affecting quality of life. Monk parakeets are originally from Argentina, but they have been imported to the US and now are inhabiting urban areas of New York City. If monk parakeets have a preference for where they choose to nest, it could help inform people who dislike parrot noise where they should live. We hypothesize that the monk parakeets have a preference for where they choose to build their nests. We used a quantitative map-based approach to identify those preferences. We recorded the GPS coordinates of 166 monk parakeet nests in New York City and mapped them into an ArcGIS. We used the NYC database of land type as additional layers in the ArcGIS map. We scored the quality of each nest location (within a 500 feet diameter of each nest) as percentage of water and greenspace, population density, and number of housing units and businesses. Another 145 randomly selected GPS coordinates were then mapped on the ArcGIS map under two conditions: with and without water locations. We scored with the same procedure as the observed nest locations. We used a Welch Two-Sample t-test to analyze the data between land type in both conditions and sample type (observed or random). We found that the monk parakeets in our sample significantly preferred to nest near greenspace compared to other types of land. Including water [$t(287.75)=9.41$ $p \ll 0.05$]. Excluding water [$t(283.37)=10.64$ $p \ll 0.05$]. Our results show a clear site quality preference in monk parakeets. This demonstration of monk parakeets' preference also suggests a new hypothesis: monk parakeets prefer greenspaces because they provide more diverse food sources for these omnivorous animals.

PSYC - 108 ANALYSIS OF WRITING QUALITY BY AUTOMATED SCORING SYSTEMS TO IDENTIFY FACTORS TO SUPPORT POOR COLLEGE WRITERS

Nathan Reder (HS), Midwood High School, Mark Lauterbach, Brooklyn College

This research project was conducted to identify traits associated with high quality writing on persuasive essays from developmental community college, undergraduate, and graduate students. A corpus of writing samples using the same writing prompt were collected from 243 students. A machine scoring system, the Tool for the Automatic Analysis of Cohesion (TAACO) was employed to identify the traits that were associated with cohesiveness. Each potential trait was compared to scores that human graders had given each individual response using an analysis of variance so that effect sizes could be calculated. A model using the cohesion variables best associated with the human quality scoring were used in a discriminant analysis. The seven variables identified were type/token ratio (a measure of lexical destiny), content repetition (a measure of giveness), and the use of the following types of connectives: positive causal, demonstratives, logical, opposition, and temporal. Additionally, word count was used in the model. The discriminant model was significant (Chi-square=85.6, df=8, $p<.001$) with an accuracy of 79.3%. The significance of this model shows that these variables accurately identify the difference between high and low quality writing. These findings may lead to instructional interventions where these traits can be targeted by teachers who will be able to effectively improve the students writing quality.

PSYC - 109 ARE THEY LAZY OR DISTRACTED: MONK PARAKEET NEST MAINTENANCE IS INFLUENCED BY SOCIAL GROUP SIZE

Larissa Brijmohan (HS), Midwood High School, Frank W. Grasso, Brooklyn College

Monk parakeets (Myiopsitta monachus) like all social creatures must balance social and physical necessities in their behavioral choices. We undertook a study on the balance of these choices in the Brooklyn monk parakeet population. The amount of effort on nest construction and maintenance by monk parakeets throughout the year indicates the value they place on their nests. We tested the hypothesis that as the group size increased, the amount of sticks carried would also increase. We analyzed 43 three-minute videos that contained nest construction and maintenance that were recorded during thousands of daily patrols in Brooklyn. We found the number of sticks carried by single monk parakeets depended on the number of parakeets in the vicinity of the focal parrot. Parrots moved fewer sticks than predicted when in a larger group size rather than when alone. A curvilinear regression analysis showed these trends were statistically significant. The number of stick manipulations increased as the parrots group size increased ($t(39)=2.79$ $p<0.01$). An additional curvilinear effect was observed. As the group size increased the rate of stick manipulations diverged from its linear increase, the rate significantly decreased ($t(39) = -2.26$ $p<0.05$). This knowledge of Brooklyn monk parakeets' behavior gives us a better understanding of their decision-making process. These relationships reflect the balance between the amount of time they spend on nest construction and maintenance versus social activities. We speculate that either monk parakeets underestimate the amount of construction and maintenance work that needs to be done when there are lots of other parrots around or they are distracted from construction and maintenance by the opportunities for social interaction in large groups.

PSYC - 110 SOCIAL CONTROL: MONK PARAKEET (MYIOPSITTA MONACHUS) CALLS BOTH EXCITE AND INHIBIT CONSPECIFIC BEHAVIORS AT THE NEST

Fizza Nayab (HS), Midwood High School, Frank W. Grasso, Brooklyn College

Monk Parakeets (Myiopsitta monachus) a gregarious species introduced by the pet trade to many locals outside its native Argentina has demonstrated its cognitive and behavioral flexibility through its adaptation for the past 40 years to the Brooklyn environment. Understanding the social vocalizations of Monk Parakeets is important for their cognitive abilities. We hypothesized that the behaviors would vary depending on the types of calls Monk Parakeets emitted. We collected 88, 30-second video samples of Monk Parakeet behaviors from 7 nests in Brooklyn. These videos were scored for type of vocalizations (chatter, contact, alarm and threat calls) and behaviors: entering the nest, exiting the nest, being physically on the nest, being inside the nest, being in vicinity of (a short distance from) the nest, making a call in response, taking flight, orienting its head or body toward the calling bird, physical contact between caller and recipient, carrying nest material and nest construction. Threat calls and alarm calls were too infrequent for analysis. In our samples, Monk Parakeets engaged in different behaviors depending on which calls were emitted $\chi2(6)= 58.20$ $p < 0.01$. We further found that Monk Parakeets make more chatter calls than contact calls when they are near the nest $\chi2(1)=7.67$ $p < 0.05$. A post-hoc analysis of these relations showed that following a call, the parrots showed significant increases arriving at the nest $\chi2(1)=13.33$ $p < 0.05$, moving to the vicinity of the nest ($\chi2$: 13.52), flying from the nest ($\chi2$: 8.97) and orientation ($\chi2$: 7.88). We found significant decreases in nest construction ($\chi2$: 8.83) and parrot-parrot contact ($\chi2$: 5.24) following a call. Our hypothesis was supported and we see that one call type may have several meanings for a Monk Parakeet.

PSYC - 111 HOW MONK PARAKEETS CHOOSE WHERE TO LIVE: THE IMPORTANCE OF POSSIBLE CHERRY TREES

Maya Tariq (HS), George W. Hewlett High School, Frank W. Grasso, Brooklyn College

Monk parakeets (Myiopsitta monachus) build structurally complex, communal nests. A previous study of the Brooklyn Monk Parakeet population found a larger amount of cherry wood included in nest materials then would be expected from the density of cherry trees (Prunus avium) in the city. The previous study speculated that this might be an anti-parasite behavior given the high cyanide content in cherry wood. This study quantified the distribution of cherry trees in the vicinity of monk parakeet nests to gather evidence for the hypothesis that monk parakeets place their nests to have access to cherry wood. We used a geographic information software system (ArcGIS), with layers that mapped the latitude and longitude of all of the trees and our custom layer of monk parakeet nest location in Brooklyn. We computed the distances between each and the closest cherry tree and closest London plane tree (Platanus acerifolia) from a sample 16 Monk Parakeet nests located in 8 colonies. The London plane tree is the most abundant tree in Brooklyn we used it as a normalizing reference for tree density. The average cherry tree to nest distance was 259.52 feet +/- 219.42 and the average London plane tree to nest distance was 136.00 feet +/- 106.36. This difference was statistically significant $t(17) = 4.13$ $p < .0007$ (Welch paired t-test). However, London plane trees are higher in abundance than cherry trees, 166,000 compared to 25,000, respectively. When we corrected for the greater abundance of London plane trees, this difference was no longer statistically significant $t(29.79) = 0.01$ N.S. We take this as evidence favoring the idea that monk parakeets choose their nest locations regardless of whether cherry trees are in close proximity.

PSYC - 112 LARGER GROUPS LEAD TO LOWER NEST CONSTRUCTION ACTIVITY LEVELS IN MONK PARAKEETS (MYIOPSITTA MONACHUS)

Nursat Jahan (HS), Midwood High School, Frank W. Grasso, Brooklyn College

Monk parakeets (Myiopsitta monachus) are an introduced species from Argentina that have adapted to life in North America. They are known for constructing large nests from sticks and sometimes these nests cause damage to urban structures. Knowledge of their nesting behavior can help us reduce damage to urban infrastructure. We hypothesized that an audience of other parrots would affect how monk parakeets manipulate sticks during nest construction. We collected a sample of 40 3-minute videos of monk parakeets at 3 nests in Brooklyn, NY. From these videos, we scored group size (# of parrots present), number of stick manipulations, and types of manipulation (sticks carried, sticks pushed in with the front beak, side of the beak, feet and beak, and moving sticks from the top to the bottom of the nest, moving beak up and down). We found 21 videos with nest construction; of these, we found 31 instances of stick manipulation. We calculated the rate in manipulation per minute ~0.04/minute for sticks carried; 2.29 /minute for sticks pushed in with the front beak; 0.71 /minute for sticks pushed in with the side beak, 0.04/minute for sticks pushed in with feet and beak, 0.02/minute for carrying sticks from the top of the nest to the bottom, and 0.84/minute for moving the stick up and down. We also found the percentage of the 3 most frequent behaviors which are sticks pushed in with front beak (75.0%), pushed with side beak (23.5%), and feet and beak (1.5%). We observed that the monk parakeets preferred to use their front beak method to add sticks to the nest. We found a trend that as the group size increased stick manipulations activity decreased. These results suggest an audience reduces parrot nest construction activities.

PSYC - 113 ARE MALE FIDDLER CRABS REPELED BY OTHER MALE FIDDLER CRABS AND ATTRACTED TO FEMALES?

Mariyum Jahan (HS), Midwood High School, Frank W. Grasso, Brooklyn College

Fiddler crabs (Uca pugilator) have been called "marsh engineers" because their burrowing has a large impact on estuary health. They live in groups and, therefore, understanding their social behavior can lead to understanding their contributions to marine habitat health. We studied the social behavior of these crabs under controlled laboratory conditions. We hypothesized that crabs would be preferentially attracted to members of the opposite sex. In the first experiment, we placed 42 "target" crabs (21 male and 21 female) into a tub with a removable opaque divider. On the other side of the divider, we placed a male or female "stimulus" crab. We scored the number of times the target crab crossed the tank after the divider was lifted. We found that just 4% of male crabs crossed, and this difference was not statistically significant. In a second experiment with 36 crabs, we counted the number of interactions between target and stimulus crabs after the divider was lifted. Here we found that male target crabs were significantly more likely to interact with female target crabs than males with males or females with either males or females (χ^2 (1) = 4.23 $p < 0.05$). Despite the low rates of response, it appears that overall male fiddler crabs will move towards female fiddler crabs in a novel environment with a short exposure time.

PSYC - 114 HOME IS WHERE THE SUPPORT IS: A REASON MONK PARAKEETS PREFER TO NEST ON TELEPHONE POLES

Meghan Stern (HS), Midwood High School, Frank W. Grasso, Brooklyn College

Monk parakeets (Myiopsitta monachus) are infamous for creating nests on manmade structures which sometimes can be a threat to human community safety. Large nests on power transformers have caused fires or blackouts in Brooklyn. The 2013 BCR lab survey revealed that only 7% of parrot nests found in Brooklyn were built on trees and the rest were found on manmade structures. We hypothesized that the mechanical support from manmade structures might explain this preference. From a collection of Annual BCR Lab Nest Assessment Surveys (NAS) photos of nests in Brooklyn we quantified the extent of the nest size and the extent of the nest's support substrate using digital tools in Adobe Photoshop. We measured the nest and the supporting substrate areas ("footprints") of 21 nests (8 trees, 13 manmade substrates). Finally, the pixel count of each footprint in an image was computed. From this, we computed the ratio of the nest-size to footprint size for each nest. If a monk parakeet nest is larger than the available support surface (footprint), this index will be positive. If this ratio is greater than 1.0 it indexes the size of the nest in excess of the substrate, less than 1.0 indicates excess substrate. A t-test found a significant difference between our ratio and for the two types of substrate ($t(18)=3.36$, $p<0.05$). These structures are flat, level, and sturdy unlike trees; this makes nest construction easier as a foundation to build from. On trees, however, the branches can be thin which makes weaving sticks harder and the chances of falling more likely. Given our small sample size and these robust statistical results, we conclude that monk parakeets prefer manmade structures because of the greater mechanical support they afford.

PSYC - 228 THE EFFECTS OF MEMORY LOAD ON HIPPOCAMPAL NEURAL ENSEMBLES

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An important question in neuroscience is how brain activity represents memory. Memory traces, or engrams, are thought to form during the acquisition of information. They store information and are reactivated during information retrieval. The biological substrate of these engrams lies in groups or

ensembles of neurons that coordinately activate upon the learning experience. In laboratory animals, activation of neural ensembles in the hippocampus, a brain structure responsible for spatial and episodic memory, causally links with the expression of memory. While this is a tremendous advance in the neurobiology of memory, brains contain a large number of memories, and we still lack an understanding of how memory experiences map out onto neural ensembles. To address this, we investigated the effects of distinct memory experiences on hippocampal neural ensembles. We trained mice to learn three different versions of an active place avoidance (APA) task having increased levels of complexity and hence, memory demands (high, medium and low). Then, we collected coronal brain slices containing the dorsal hippocampus and performed immunohistochemistry and confocal imaging to examine and quantify activated neural ensembles in the CA1 area of the mouse hippocampus. The preliminary results show that CA1 ensemble size correlates with memory load, suggesting that task complexity plays a role in the formation of memory engrams. This work is important because understanding more about how memory functions in the deep parts of the brain could allow for more targeted treatment of neurodegenerative diseases like Alzheimer's and Parkinson's.

PSYC - 229 MAPPING OF NEURAL ENSEMBLES ASSOCIATED WITH SPATIAL MEMORY ACROSS THE SEPTO-TEMPORAL AXIS OF THE MOUSE DORSAL HIPPOCAMPUS

Khader Albanna[1] (UG), **Daniel Mishan**[1] (UG), Saul Tbeile[1], Alisher Podavonov[1], Samuel Meyerovich[1], Anna Petrovicheva[1], Juan Marcos Alarcón[2]
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Memory is thought to rely on the strength of synaptic connections that support neural networks. Synaptic plasticity, a molecular mechanism that modulates the strength of synaptic connections, is ascribed as the cellular substrate of learning and memory processes. This marvelous understanding of the molecular and cellular mechanisms of memory notoriously contrasts with our poor understanding of memory at larger scales, i.e. neural circuits and brain systems. Hence, the goal of this project is to map neural ensemble activity associated with spatial memory in the hippocampus, a medial temporal lobe brain structure that supports episodic and declarative memory. Specifically, we will characterize memory-associated neural ensembles across the septal-temporal axis of the dorsal hippocampus from transgenic mice trained to learn a spatial memory task. To do so, we will reveal neurons active during memory recall using Immediate Early Gene (IEG) tagging methodology. This includes labeling of activated neurons in the Arc-Cre/flox-eYFP transgenic mice. Activated/labelled neurons in coronal brain slices were visualized through immunohistochemistry and confocal imaging techniques. Quantification of active neurons within the hippocampal circuitry will provide us with a measurement of memory-associated neural ensembles in these mice. We expect to provide results that would establish a correlation between neural ensemble size and degree of memory retention along the anatomy of the dorsal hippocampus network.

PSYC - 235 THE EFFECT OF DRAWING VS. WRITING ON SHORT-TERM MOOD REPAIR

Annalissa Thomas (UG), Jennifer E. Drake, Brooklyn College

This study investigated the effect of drawing and writing on short-term mood repair and whether participants used these activities to distract or express themselves from their negative thoughts and feelings. In order to induce a sad mood, I asked 60 undergraduate students to re-experience the saddest memory they had ever experienced. Participants were then randomly assigned to either a drawing or writing condition and were asked to freely draw or write for 10 minutes. Mood was measured by having participants complete the Positive and Negative Affect Schedule (PANAS) before and after the mood induction and after the activity. Participants were then asked whether they used the activity to distract or

express themselves from their negative thoughts and feelings. Participants also completed a flow and enjoyment questionnaire. Results showed that both activities (drawing and writing) increased positive affect and decreased negative affect from after the mood induction to after the activity. Participants in the drawing condition used the activity to distract from their feelings whereas those in the writing condition used the activity to express their feelings. While there was no difference between the conditions for enjoyment, those in the drawing condition experienced more flow (a measure of absorption in the activity) than those in the writing condition. These results demonstrate that both activities improved mood equally. These findings provide evidence of how individuals may use these activities to aid in short-term mood repair.

PSYC - 236 REACTION TIME MEASURES REVEAL PROCESSING DIFFERENCES BETWEEN SOLID LINE AND GROUPED DOT PATTERNS

Ana Liang (UG), Daniel D. Kurylo, Brooklyn College

Choice reaction time (RT) reflects the cumulative time-scale of stimulus processing, perceptual decision, and behavioral response. For simple visual patterns, discrimination requires an initial accumulation of evidence, which is directly related to stimulus quality. For stimuli that require perceptual grouping, more elaborate processing is required that occurs after the stimulus is collected. To investigate the time-scale of these conditions in a rat model, rats were trained to discriminate vertical vs. horizontal orientation of either solid lines or dot patterns that were perceptually grouped. Stimulus quality was controlled by varying stimulus duration. Rats held their head in a central funnel while viewing a computer monitor. Following a random delay, a stimulus appeared, after which rats removed their head (measured as RT1: time from stimulus onset to initial response). The stimulus was removed as rats' head left the funnel. Rats then moved to one of two reward wells, indicating their discrimination choice (measured as RT2: time from head out of funnel to head entering reward well). It was found that across stimulus duration, RT2 were longer for dots than lines, likely reflecting the increased computational load associated with grouping. For lines, RT for correct and error trials differed for RT1, but were equivalent for RT2, suggesting an accumulation of evidence effect. For dots, RT for correct and error trials were approximately the same for RT1, but diverged for RT2, suggesting post-stimulus processing. Together, results suggest that discrimination of solid lines operates on the afferent signal, whereas discriminating dots requires an increased time-scale where discrimination operates on an internal representation of the grouped stimulus.

PSYC - 237 CRITICAL STIMULUS DURATION FOR DISCRIMINATING PERCEPTUALLY GROUPED PATTERNS

Ana Lakshin (UG), Daniel D. Kurylo, Brooklyn College

Initial sampling of stimuli during early stages of visual processing requires encoding of stimulus properties. Theoretically, complex stimuli, such as those requiring perceptual grouping, need additional stages to complete stimulus processing. The aim of the current study was to determine the minimum level of stimulus information, termed critical stimulus duration (CSD), required to derive perceptually grouped patterns in an animal model. It was hypothesized that grouped patterns require longer initial sampling in order to support the longer time-scale of grouping. Rats were trained to discriminate the orientation of simple shapes constructed from either solid lines, which don't require grouping, or dot patterns, which required grouping by similarity in luminance. In order to highly limit stimulus duration, stimuli were presented on a CRT monitor at a high refresh rate (120 Hz), recorded directly by a light-sensing circuit. Test stimuli were followed by a pattern mask in order to disrupt post-stimulus effects (e.g., neural persistence). Percent correct discrimination was determined across stimulus durations ranging from 8.3 ms (single refresh) to 116.7 ms. Performance at each duration was based upon at least 200 trials collected

across multiple sessions. Data were used to generate psychometric functions, and CSD was based upon the 75% threshold. Results indicate chance performance at 8.3 ms, verifying adequate limitation of stimulus duration. Increasing duration resulted in progressive increase in performance. Contrary to the hypothesis, CSD was equivalent for both stimulus types, reaching 75% threshold at 44 ms. Results indicate that additional processing for grouping does not require additional sampling of the afferent signal, but instead may occur further downstream.

PSYC - 238 DEVELOPING A NEUROPSYCHOLOGICAL TEST TO ASSESS VISUAL COGNITION IN SCHIZOPHRENIA

Samuelle Delcy (UG), Daniel D. Kurylo, Beliz Hazan, Brooklyn College

Perceptual organization (P.O.) is the part of visual processing responsible for grouping stimulus elements. Previous research has identified deficits in low-level P.O. in patients with schizophrenia. These findings support theories on the inability to properly process information due to disorganized symptoms and dysfunction within the frontal-parietal complex. In order to study P.O. impairment at a higher level of visual processing, a neuropsychological test was developed to assess global visual processing by means of problem solving. The goal was to adapt an existing test of context processing in order to be used with patients with schizophrenia. A challenge of developing such a test was to accommodate cognitive dysfunction and disorganized symptoms for this clinical population. To make the test more comprehensible, the number of comparisons and visual variables were reduced, and questions were restructured to be more focused. It was hypothesized that the modifications would (1) make test items easier while (2) maintaining sensitivity of test measures. The new test was administered to 19 people ranging in age from 17-63 years. Results indicated significantly lower thresholds for the revised test ($M=2.29$ $SD=0.94$) compared to the original version ($M=5.38$ $SD=2.30$) ($t(18) = 7.78$, $p < 0.001$). In addition, correlations between the two tests were either significant or at borderline significance for 4 out of the 6 test items, and mean performance correlated significantly between the test versions (Pearson paired samples: $r = 0.736$, $p < 0.001$). Results verify that the revised test is easier, maintains sensitivity of test measures, and is thereby more suitable for the clinical population.
Support by NSF.

PSYC - 239 MENTAL HEALTH LITERACY AMONG DIVERSE UNDERGRADUATE STUDENTS: IMPACT OF ACADEMIC FACTORS

Jessica Garrett (UG), Alla Chavarga, Rose Bergdoll, Rona Miles, Laura A. Rabin, Brooklyn College

Though mental health disorders affect millions of people each year, the general population lacks proper understanding of such disorders and their treatment. Mental health literacy, which can be defined as knowledge and beliefs about mental health disorders, may facilitate help-seeking attitudes, reduce stigma, and promote prevention and early treatment (Jorm et al., 1997; Spiker, & Hammer, 2018). Several demographic variables have been studied in relation to mental health literacy (e.g., gender, age, education), in addition to college program of study. However, very little has been done to study undergraduate major—with one study showing that clinical psychology coursework was associated with higher mental health literacy (Furnham, Cook, Martin, & Batey, 2011). The current study expands upon previous work and hypothesizes that as psychology students advance through the undergraduate curriculum, mental health literacy increases. Participants were 1272 undergraduate students at the City University of New York (9 different campuses) who completed a demographic factsheet in addition to a recently developed, multiple choice Mental Health Literacy Questionnaire/MHLQ, which addresses symptoms of psychological disorders, knowledge of their causes, risk factors, and treatment. Results support the hypothesis: For both Psychology and Non-Psychology majors, year 4 students had significantly

higher MHLQ scores than year 1 students (p<.001). Additionally, in years 1 and 4, Psychology majors scored significantly higher on MHLQ than non-Psychology majors (p<.001). Future research should examine mental health literacy in relation to other influential factors (e.g., clinical courses, personal experience) with an eye towards developing targeted interventions for at-risk students.
Support by NSF: REU Award #1757560; JCK Foundation.

PSYC - 240 CONTEXT PROCESSING AS A CENTRAL MECHANISM AMONG COGNITIVE DOMAINS

Mahfuza Sabiha (UG), Daniel D. Kurylo, Beliz Hazan, Brooklyn College

Previous studies have shown an effect of contextual clues in a variety of cognitive domains, including high-order vision, language, memory, and problem solving. Engagement of contextual cues may be specific to each cognitive domain, or they may reflect a central, common mechanism. It was predicted that context processing is a central mechanism, where the capacity to use contextual cues should co-vary across domains. Five tests of context were administered to 33 subjects: (1) Social Situations Sequencing Test, (2) Cambridge Contextual Reading Test, (3) Insight Problems, (4) Contextual Memory Test, and (5) Interpretation of Infographics. These tests were adjusted to be administered with and without clues. Repeated measures analysis of variance (ANOVA) was applied to the with- and without-context conditions for each cognitive domain. Results indicated significant main effects of domain ($F(3,90) = 150.3$, $p < .0001$) and context ($F(1,30) = 14.6$, $p = .001$), whereas the interaction of domain and context did not reach significance ($p = .157$). Pearson correlations were then determined for the effect of context in each domain. A significant correlation was found between Problem-Solving and Language ($r = .376$, $p = .034$), while Vision and Memory ($r = .328$, $p = .072$) and Vision and Infographics ($r = .308$, $p = .098$) were of borderline significance. No other test pair correlated significantly. While the lack of significance in this study may be attributed to variability in cognitive testing, the significant correlation suggests that a central effect of context exists due to an interaction of cognitive domains across neuropsychological tests, such as the interaction between problem solving and language, which involves understanding the language context of insight problems.

PSYC - 241 MONK PARAKEETS (MYIOPSITTA MONACHUS) SYSTEMATICALLY ALTER CALL STRUCTURE IN RESPONSE TO URBAN ANTHROPOGENIC NOISE

Tatyana Desire-Brisard (UG), Frank W. Grasso, Brooklyn College

Anthropogenic noise impacts breeding success in many avian species, and cognitive coping strategies offer a means to reduce effects of this ecological stressor. We hypothesized that Monk Parakeets would alter call structure in response to anthropogenic noise because they are age-independent vocal learners. We collected 355, 3-minute and 56, 1-minute recordings of Monk Parakeets at their nests in Brooklyn, NY and Barcelona, Spain. From these we extracted 321 instances of parrot calls and ambient noise. The background noise was characterized by human listeners as car noise, human speech, construction, wind, other bird species calls and other sounds. In a pilot study, we extracted 23 audio selections and analyzed them using the Raven Analysis Program (Cornell Ornithological Institute) for average amplitude, peak frequency contour, max frequency, and max slope of the calls. We found significant differences in the increase in peak call frequency [$t(73) = 17.40$ $p < 0.01$] and slope [$t(73) = 9.41$ $p < 0.01$] with increased noise levels in calls. On the strength of this result, we collected and analyzed a larger data set using Raven for quartile frequency profiles of signal energy. We found a significant interaction of car noise and parrot vocalization on profile structure [$F(3,315) = 3.99$ $p <0.01$]. No other sounds show significant effects on the quartile profiles. Individual Fs indicated a marginally significant effect of car noise on Q1 [$F(1,317) = 3.51$ $p=0.062$], and significant effects on Q2 [$F(1,317) = 5.08$ $p<0.05$] and Q3 [$F(1,317) = 9.81$ $p<0.01$]. We conclude that Monk Parakeets employ a complex method to alter their call structure in response to noise.

This raises the possibility that Monk Parakeets are capable of using (producing & perceiving) acoustically distorted calls.

PSYC - 242 UNDERGRADUATE NARRATIVES OF TRAUMATIC EXPERIENCES: EXPLORING MEANING-MAKING AND EMOTIONS IN A DIVERSE URBAN COLLEGE SETTING

Yamilet Cruz (UG), **Destiny Mercado** (UG), Justin Cantor, Khandaker Rishalatullah, Pa Her, New York City College of Technology

Research demonstrates that cognitive appraisals about a traumatic experience may be associated with well-being. This study examined the trauma writings from individuals participating in an intervention study to understand the role meaning-making, and emotional tone in trauma adaptation. College students were randomly assigned to one of three experimental groups. One group was given conventional instructions for writing about a traumatic experience; another was instructed to write about the trauma from a meaning making perspective; and a control group wrote about a trivial topic. Narratives in the writing conditions for the conventional and meaning-making were coded for type of traumatic event, emotional tone, and meaning-making appraisal. T-tests analysis will be used to examine whether participants in the meaning-making group had more positive adjustment. These findings may have important implications in augmenting the health-promoting effects of cognitive appraisals in written narratives.

Support by Bridges.

PSYC - 243 IMPACT OF PERCEIVED CONTROL AND MOTIVATION ON INTERNALIZING DISORDERS

Miriam Sheynblyum (UG), Jacob Shane, Brooklyn College

Low perceived control is linked with higher prevalence of internalizing disorders, such as depression and anxiety, but the mechanism through which they are linked is understudied. One possible mechanism is an individual's motivational self-regulation. Adaptive motivational self-regulation includes: disengagement from unattainable goals, and engagement in attainable goals. Prior research has found that individuals with disengagement traits are more likely to reduce effort toward unattainable goals, thus minimizing the likelihood of depressive and anxiety symptoms. However, there is minimal research investigating how motivational self-regulation interacts with perceived control in predicting the likelihood of internalizing disorders. The present study examined this research question and hypothesized that low perceived control and ineffective goal regulation will predict increased depressive and anxiety symptoms. The data came from the Survey of Midlife Development in the United States (MIDUS 3), which is a nationally representative random-digit-dialing sample of non-institutionalized, English speaking adults, aged 25 to 74 (N=2598). Results from hierarchical logistic regression analyses indicated that low perceived control significantly predicted increased depression and anxiety; however, no significant interaction was found between perceived control and motivation. These findings suggest that low perceived control is the primary driver of concurrent levels of depression and anxiety, regardless of motivational self-regulation traits. More research is needed to understand the mechanisms through which perceived control and internalizing disorders are related, particularly how these relationships develop over time.

Support by NSF REU Award #1757560.

PSYC - 244 IS COMPASSION CORRELATED WITH PSYCHOLOGICAL DISTANCE?

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Construal-Level Theory refers to how the level of abstraction used during perception relates to psychological distance; a reference point to the self, and the different ways in which something is removed from that point. Research suggests that feeling close to someone may increase the likelihood of showing compassion. This implies that a lack of compassion can be related to feeling psychologically distant; removing oneself from immediate experience. This study aims to examine the relation between compassion and psychological distance. We hypothesized that higher compassion correlates with lower psychological distance. A total of 200 undergraduate students ages 17-41 (M=20.76; SD=3.83) were enrolled in the study. Compassion (compassion for others, compassion from others, and self-compassion) was measured using The Compassionate Engagement & Action Scales. Participants wrote a Day in The Life Narrative response to pictures of several homeless and non-homeless individuals. Text responses were analyzed for psychological distance using the Linguistic Inquiry & Word Count. Results of Pearson's correlation showed that while compassion for others was not significant, compassion from others and self-compassion exhibited weak negative correlations with psychological distance. Results of the linear regression indicated that as compassion from others and self-compassion increased, psychological distance decreased (R^2=.107, F (3,195) = 6.92, p<.01). It was also found that women exhibited less psychological distance than men. These results provide evidence that psychological distance and compassion are related. Examining these two constructs can lead to research in the development of interventions that may result in more social connectivity and improved prosocial behaviors.
Support by NSF REU Award #1757560.

PSYC - 245 CONTINUITY OF FRIENDSHIPS ACROSS ADOLESCENCE AND ITS EFFECT ON ROMANTIC RELATIONSHIP QUALITY IN EARLY ADULTHOOD

Mahogani Keith (UG), Cheryl L. Carmichael, Brooklyn College

Friendship relationships play a role in acquiring social skills. Among children's and adolescents' friendships, there is an emphasis on intimate exchanges that support a sense of identity, respect, sensitivity to the needs of others, and maintenance of mutual relationships with agemates. Thus, adolescent friendships are a precursor to romantic relationships, and it is theorized that adolescence provides a framework that can be used to help successfully navigate romantic relationships in early adulthood (Hartup & Stevens, 1997). Continuity in friendships is expected to be of particular importance because, like parent-child relationships, continuous friendships could provide a sense of security. The goal of this study is to investigate whether people who have more continuity in their adolescent friendships also have higher quality romantic relationships in early adulthood. Early adult participants (n = 250, age 18-30) are being recruited for an online correlational study. In the online survey, participants provide information about their adolescent friendships (e.g, length, quality, amount of time spent together, and conflict) and current romantic relationship quality (satisfaction and conflict resolution) as well as answer questions about attachment, personality, and demographics. Using regression analysis, this research will test whether features of adolescent friendship continuity (e.g, longest adolescent friendship, average length of friendships) are positively associated with relationship quality with one's current romantic partner. The unique role of friendship continuity in adolescent friendships will be discussed.
Support by NSF REU Award #1757560.

PSYC - 246 KNOWLEDGE OF CAMPUS COUNSELING CENTER LOCATION IN RELATION TO MENTAL HEALTH HELP-SEEKING ORIENTATION AMONG DIVERSE UNDERGRADUATE STUDENTS

Sadé Thomas[1] (UG), Alla Chavarga[2], Anjali Krishnan[2], Rona Miles[2], Rose Bergdoll[2], Laura Rabin[2]
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Although the prevalence of mental health issues among college students has increased steadily in recent years, many fail to seek professional support from campus-based resources. Reasons for students' failure to seek treatment may include: lack of time, financial constraints, stigma, and uncertainty about the usefulness or confidentiality. These factors may influence one's help-seeking orientation (HSO), a predisposition to seeking care for mental health issues. A variable that could impact HSO, but has not been previously investigated, is whether students know the location of their campus counseling center. We asked undergraduate students at nine CUNY campuses to report whether they know the location of their college counseling center. Those who indicated that they do know, were asked to report that location. Next, we investigated whether HSO was higher for students with correct knowledge. Results, controlling for age, support our hypotheses: students who knew the correct location scored highest on HSO, students who incorrectly identified the location scored second highest, while students without knowledge of location scored lowest ($p<.001$). Females comprised the majority among groups who correctly or incorrectly identified counseling center location (75% and 73%), but comprised about half of those who said they did not know its location ($p<.001$). Psychology majors were overrepresented in groups that identified (either correctly or not correctly) the counseling center location, relative to students who did not know ($p<.001$). Students who know where the counseling center location seem more open to actually availing themselves of services. We discuss the implications for designing effective educational interventions.

Support by NSF REU Award #1757560.

PSYC - 247 MEMORY AND METAMEMORY ACCURACY DIFFER WHEN SIMILARITY BETWEEN STUDY AND TEST VARY

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Metacognitive processes enable us to better understand how we learn. "Judgments of learning" (JOLs) are metacognitive judgments made at the time of encoding about how well information has been learned. Gaynor & Chua (2017) examined the brain basis of associative encoding and JOLs with conventional transcranial direct-current stimulation (tDCS, a type of non-invasive brain stimulation) and showed poorer encoding with tDCS over the prefrontal cortex, but no effect on JOLs, likely due to poor spatial resolution. Furthermore, Gaynor & Chua (2017) also showed that JOL accuracy differed based on the similarity between study and test presentations. The current experiment follows Gaynor & Chua (2017) and examines: 1) differences in memory accuracy and judgments of learning (JOLs) when word-pair associations were similar or dissimilar at test, and 2) the involvement of prefrontal subregions in JOLs, namely the dorsolateral and anterior prefrontal cortices. At study, participants were instructed to memorize word-pairs by forming associations between them, and then to make immediate JOLs about how well they learned the individual pairs, while HD-tDCS was applied. One day later, in an associative recognition task, participants were tested on intact, rearranged, or new word pairs. Preliminary data ($n=15$) showed better recognition and higher JOL accuracy for intact compared to rearranged pairs

($p<0.05$). There was no effect of stimulation, likely due to limited statistical power as data collection is ongoing.

PSYC - 248 SCHOOL ABSENTEEISM IN YOUTH WITH INFLAMMATORY BOWEL DISEASE: IMPACT OF INDIVIDUAL AND FAMILY FACTORS

Esther Fried (UG), Laura C. Reigada, Brooklyn College

For individuals with inflammatory bowel disease (IBD), school attendance reflects the ability to cope with everyday life despite managing a medical condition. This study will examine individual and family factors that affect school absenteeism for youth with IBD (parental coping, parental demographics, child social functioning and internalizing symptoms).Thirteen youth with IBD, ages 10-17, were recruited from a pediatric gastroenterology clinic. Nine participants were classified as high absence (H-A) and four participants were classified as low absence (L-A). Self-report measures included child's social functioning related to IBD (IMPACT-III5), child internalizing symptoms (Patient Reported Outcome Measures Information System6), parental demographics and parental levels of coping with their child's illness (Coping Health Inventory for Parents7), which assesses three coping patterns: family integration, social support, and medical understanding of the illness7. Cohen's d effect sizes examined variables of interest between the H-A and L-A groups. L-A parents showed improved coping, (d= 1.6), replicated in all three domains: family integration (d=0.7), social support (d= 2.9), and medical understanding of the illness (d=0.3). H-A youth reported better social functioning (d=0.2) and fewer internalizing symptoms (d=0.2). These data suggest that while both individual and family factors can affect school attendance, family factors may play a larger role . Based on this very small sample, parental coping, in particular parental social support, may be a contributor that is related to school attendance. Limitations include small sample size and variability in type of school absence (e.g., due to medical visits, at the time of diagnosis, disease exacerbation).

PSYC - 249 EXAMINING DIFFERENTIATING PSYCHOSOCIAL FACTORS BETWEEN YOUTH WITH IBD AND COMORBID IBD-IBS

Radhika Patel (UG), Laura C. Reigada, Brooklyn College

Inflammatory Bowel Disease (IBD) and Irritable Bowel Syndrome (IBS), although two distinct diagnoses, are highly comorbid diseases. Individuals with IBD are at a three-fold risk for developing comorbid IBS-like symptoms and both conditions have a significant impact on a patient's quality of life. Identifying the factors that associate with comorbidity will help physicians and psychologists with comorbid medical management as well as comorbidity prevention.The aim of this study is to examine differentiating psychosocial factors between youth with IBD and youth with comorbid IBD-IBS. The psychosocial factors examined in this study were parental behavior (Coping Health Inventory for Parents), health-related quality of life (IMPACT-III), stress (Acute Stress Checklist for Children), and anxiety, both general (Screen or Child Anxiety-Related Disorders) and illness-related (IBD-Specific Anxiety Scale). There was no statistically significant results, but small to moderate effect sizes signal that if this study was replicated across a larger sample, there may be significance among the psychosocial factors. Generally, adolescents who had a comorbid IBD-IBS diagnosis reported having greater illness-related anxiety, more acute stress reactions to traumatic events, a lower quality of life, and parents who had poorer coping patterns than adolescents with only an IBD diagnosis.

PSYC - 250 THE EFFECT OF FEELING OF KNOWING RATINGS ON METACOGNITIVE CONTROL OF MEMORY

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Sometimes people are unable to recall information, but have a "feeling-of-knowing" (FOK) that the sought-after information is in memory. FOK is part of metamemory, which is broadly defined as the knowledge of one's own memory. Metamemory is thought to consist of monitoring and control processes. Metamemory monitoring typically involves assessing the accuracy of one's own memory, and is assumed to allow for metacognitive control of memory, thereby improving performance. Previous research has shown that the dorsolateral prefrontal cortex (DLPFC) plays a role in metamemory monitoring, using a FOK task. However, little is known about how FOK ratings impact later strategic control of memory, or if the DLPFC has a role in this relationship. The present experiment tests if FOK ratings would impact later strategic control of memory and uses brain stimulation to test for a role for the DLPFC. Participants were asked to provide answers and FOK ratings to general knowledge questions. Following the FOK rating, participants chose to receive a hint and reanswer a subset of unknown questions. They also received a hint and re-answered questions chosen by the researcher. High definition transcranial direct current stimulation (HD-tDCS) was applied to the DLPFC while participants made the FOK judgments and after they made the FOK judgments; sham HD-tDCS was applied as well. Preliminary data (n=27) showed participants had higher FOK ratings for the questions they chose to get hints for vs. the researcher-chosen questions. There was no effect of brain stimulation. This research furthers our understanding of the relationship between metamemory monitoring and control processes, but the neural basis of this relationship remains unclear.

PSYC - 251 TALK TO ME BABY! EXAMINATION OF WHETHER A LANGUAGE INTERVENTION CAN BOOST 5-MONTH OLD INFANTS' LANGUAGE INTERACTIONS WITH PARENTS AT HOME

Mariez Siefeen (UG), Yana Kuchirko, Brooklyn College

Learning language is one of the most important milestones in infancy, during which time babies go through a sensitive period of development. In this study, I investigate whether the Talk To Your Baby (TTYB) intervention is effective in increasing the amount of language mothers speak to their infants during everyday routines at home. A randomized control study was implemented using the TTYB intervention. A total of 400 families took part in the study shortly after their infants' birth. In the experimental group, families received text messages with tips on language development for the first 6 months of the infants' life and other materials. Families in the control group received services from the home visitation program as usual for the first few months of the infants' life. A follow up study randomly selected 30 families (15 from control, 15 from experimental) to examine the effect of the program on mothers' language input to infants. All families were visited by a research team and a LENA device was installed into a vest which 5-month old infants wore for a whole day. The LENA device captured 16 hour-recordings of infants' language environments. The 16-hour recordings were analyzed by the LENA program for total number of adult words infants heard. Then, the 10 minute segments from each audio record that contained the highest amount of language directed only to the child were selected, transcribed and analyzed for number of different words mothers used with their infants. Surprisingly, there were no significant differences in the amount of language spoken to infants between the control and experimental groups, suggesting that the TTYB intervention wasn't effective in increasing the mother-infant interaction.

PSYC - 252 ASSESSING DIETARY INTAKE OF OMEGA-3 AND OMEGA-6 FATTY ACIDS: DHQ-II VS. DRIED BLOOD SPOTS

Dajana Alku (UG), Laura C. Reigada, Brooklyn College

The DHQ is a questionnaire that is often used in epidemiological studies to assess dietary intake, however such self-report measures present methodological limitations due to misreporting, which was found to be particularly acute for fats. The current study aims to evaluate the ability of the DHQ to assess ω-3 and ω-6 FA daily intake by comparing it to the percent of ω-3 FA and ω-6 FA content measured in red blood cell (RBC) membranes extracted from collected dried blood spots (DBS), an objective biomarker. 93 female participants (Mage = 21.6, SDage= 3.9) were recruited from Brooklyn College. They were asked to provide a DBS sample and complete the DHQ. Normality of the data distribution was explored and the data was found to be significantly deviant from normal. Thus non-parametric Spearman correlations were computed to assess the relationship between the DHQ estimated ω-3 and ω-6 intake and dried blood spot measured percentage of ω-3 and ω-6 content in RBC; the analysis revealed a moderate correlation between DHQ estimates and DBS measures of EPA ($r_s = 0.45$, $p < 0.001$) and DHA ($r_s = 0.59$, $p < 0.001$), and little to no correlation of ALA ($r_s = 0.01$, $p > 0.05$), LA ($r_s = 0.06$, $p > 0.05$) and ARA ($r_s = 0.10$, $p > 0.05$). A Kruskal-Wallis test was conducted to explore differences in the data by ethnicity; there was a significant difference in average FA intake by ethnicity for both DHQ data and DBS measurements, but for different FAs.These results highlight the differences between the self-report and biomarker measures of FA consumption, suggesting that the DHQ estimates of FA intake are questionable. The study emphasizes the need for further research to provide greater insight on how reliably the DHQ estimates ω-3 and ω-6 dietary intake.

PSYC - 253 RACIAL/ETHNIC GROUP DIFFERENCES IN SCHIZOTYPAL TRAITS IN THE GENERAL POPULATION

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Schizotypy is a frame of personality characteristics argued to be on a spectrum and reflects proneness for development of schizophrenia-spectrum disorders. Schizotypy and schizophrenia are conceptualized dimensionally, with three primary symptom domains; positive (hallucinations, delusions, disordered speech), negative (anhedonia, apathy, amotivation), and disorganized (thought disorder, neurocognitive deficits) symptoms. The fully-dimensional approach to schizotypy posits that it is the result of natural variations of the nervous system; moreover, its extreme results in vulnerability to mental illness (Nelson, Seal, Pantelis, & Phillips, 2013). Current literature notes that basic demographics such as race/ethnicity have been shown to influence schizotypal traits in the general population (Goulding et al., 2009; Kwapil et al. 2007; Tortelli et al., 2018). This study seeks to further investigate the relationship of race/ethnicity with schizotypal traits towards possibly identifying risk factors. It is hypothesized that race/ethnicity will be related to schizotypal traits, such that Black/African American individuals will report lower schizotypal traits than other racial/ethnic groups. Subjects will include an estimated 90 individuals between the ages of approximately 18-65 years, recruited from a University. Measures include a demographic questionnaire and the Schizotypal Personality Questionnaire (Raine, 1991) to assess race/ethnicity and self-reported schizotypal traits, respectively. Data collection is currently in progress. A MANOVA test will be used to examine racial/ethnic group differences in (positive, negative, disorganized, total) schizotypal traits. Results will be interpreted from a diathesis-stress perspective, with consideration of implications.

PSYC - 254 SIZE IS NOT EMBODIED! EVEN WHEN TESTED WITH AN EXPLICIT SENSORIMOTOR TASK OR A MORE SALIENT MANIPULATION

Maryam Choudhary (UG), **Stephen P. Bryson** (UG), Natalie Lisiewicz, Zhiyue Wang, Stephanie Aldime, Natalie A. Kacinik, Brooklyn College

Embodied cognition is a theory claiming that our mental representations and processes are grounded or "embodied" in our sensorimotor experiences and interactions with the world. This general notion has received considerable research support, but recent experiments in our lab with manipulations of size have failed to support the theory, even when participants explicitly judged the size of a word's appearance, or the size of the item the word represents. The present study consisted of two experiments designed to further investigate the embodiment of size. One involved deciding whether each word represented something that could be easily picked up and held in one's hand (a task requiring explicit activation of sensorimotor information), while participants in Experiment 2 decided if the word represented something big or small. This is the same "item decision" task used in one of our previous experiments, but the stimuli in the current study were presented with greater, more pronounced differences in text size of 10, 22, and 34-point Arial font vs. the 16, 22, and 28-point fonts used before. Similar to our previous findings, the "hand" task failed to produce significant effects. In contrast, the results for the more salient size manipulation were significant and seemed to initially support the embodiment hypothesis. However, separate analyses of words representing big and small items revealed effects in opposite directions, indicating that participants were generally slower at processing words in the smallest 10-pt font regardless of their meaning. All of our results thus fail to support the embodiment of word meaning regarding the property of size, but some issues and potential explanations will be discussed.

PSYC - 255 HOW DOES THE STRUCTURE OF INFANTS DAYS CHANGE OVER THE COURSE OF DEVELOPMENT?

Jessica Pitts (UG), Yana Kuchirko, Brooklyn College

Infant development takes place in many contexts and with different people. As infants engage in routine activities, they encounter objects and hear different forms of language from the various people in their lives (e.g., grandparents). Theories of human development have emphasized how different contexts and people socialize and shape children's learning; however, the majority of research in developmental science has focused on the mother and infant in book sharing and play. Book sharing and play are activities that shape infants' later development; however, they are just two of the many activities infants experience. Interviews were conducted with African American, Dominican, and Mexican mothers when infants were 1, 6, 14, and 24 months old. The mothers were asked to describe their infants' activities with different people for the previous day. Responses were categorized into 8 activities (e.g., caregiving) and the duration of each activity was coded. Results showed that infants spend most of their time in caregiving, followed by unstructured activities. The amount of time infants' spent in different activities changed over development (e.g., infants' spent less time in caregiving and more time playing). Finally, infants' interactions with different family members increased over time. These results provide a broader scope of infants' activities with different people throughout the day, suggesting that infants spend a large portion of their day with people that are largely ignored by developmental science. This has implications for future studies seeking to understand how infants' daily activities shape their development.

PSYC - 256 AN APPETITIVE WITHIN-SUBJECTS PARADIGM FOR EXPLORING THE NEURAL MECHANISMS OF LATENT INHIBITION

Anastasiya Kharlamova (UG), Ingrid Reverte, Stephen Volz, Guillem Esber, Brooklyn College

Latent Inhibition (LI) is a reduction in the ability of a cue to signal reinforcement if it is previously exposed without a consequence, by comparison with a novel cue. Differences in LI have been observed in schizophrenic patients, making it a potentially useful biomarker of the disorder. To avoid generalization between the novel and exposed cues, the vast majority of LI demonstrations in rats has employed between-subject designs, and the few within-subject demonstrations that exist used aversive conditioning procedures. This makes it difficult to study the neural bases of the phenomenon using in-vivo electrophysiological recording, which benefits from large numbers of trials and within-subject demonstrations. To overcome this, we developed an appetitive within-subject design of LI. Rather than using the traditional retardation test, this design compares the rate of discrimination between two preexposed and two novel cues following the preexposure phase. Our results show a faster rate of discrimination for the novel than preexposed cues, revealing the effects of LI. This design offers an unprecedented opportunity to investigate the neural circuits involved in this phenomenon, and it has the potential to deepen our current understanding of cognitive deficits in schizophrenia.

PSYC - 257 ROLE OF THE AUTONOMIC NERVOUS SYSTEM IN EMOTION RECOGNITION OF ANGRY FACES

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Gender differences in autonomic nervous system (ANS) activity and their relationship to affective processing have been extensively researched. Past research has found that threatening stimuli caused heart rate (HR) acceleration in women (indicative of a fight-or-flight response) but HR deceleration in men, suggesting that there is a gender based ANS difference. Past research also shows that females tend to perform better than males on emotion recognition tasks, though the underlying mechanisms that affects this difference remains elusive. This experiment sought to assess how gender differences in ANS activity, specifically HR and skin conductance response (SCR), may affect the accuracy of emotion recognition of emotional faces that convey threat-relevant information, e.g. angry and fearful faces. The SCR and HR of college-aged participants were measured while they observed faces conveying emotions of happiness, sadness, fear, and anger. The participants were then asked to identify the emotion. We hypothesized that there will be a greater difference in the SCR and HR while observing and recognizing an emotion compared to baseline for those who correctly identify an emotion. In other words, greater arousal will be observed in females since they have shown to perform better than males on emotion recognition tasks. Consistent with previous results, females performed better on emotion recognition tests than males. However, the connection between these results and ANS activity have yet to be analyzed.

PSYC - 258 SEX DIFFERENCES IN SCHIZOTYPAL TRAITS REPORTED IN THE GENERAL NON-CLINICAL POPULATION

Megane Nacier (UG), Deborah J. Walder, Victoria Martin, Brooklyn College

Prior research has demonstrated sex differences in schizophrenia spectrum disorders. In line with a dimensional model of psychosis, sex differences in psychotic-like symptoms have been demonstrated in non-clinical samples. The current study is designed to extend this limited body of research by examining sex differences in positive, negative, disorganized, and total psychotic-like symptoms in the general population. Subjects include at least 90 individuals recruited from a university sample. Measures include

a demographic questionnaire and the Schizotypal Personality Questionnaire (Raine, 1991) to assess sex and self-reported schizotypal traits, respectively. Data collection is currently in progress. A MANOVA test will be used to examine sex differences in (positive, negative, disorganized, total) schizotypal traits. Results will be interpreted with consideration of implications.
Support by NSF REU Award #1757560.

PSYC - 259 AN OBJECTIVE CLASSIFCATION OF MONK PARAKEET VOCALIZATIONS IN THE FIELD
Robert Slay (UG), Frank W. Grasso, Brooklyn College

Monk parakeets (Myiopsitta monachus) have complex vocal learning systems, on par with those of all the parrots. Their large, stable social groups make their communication of particular interest. The current classification of monk parakeet vocalizations used in field research is subjective and includes 11 distinct calls. Because this classification system relies on human perception, a more precise method of classifying the calls will be useful in studies of their social structure and communication. We collected 42 selections of monk parakeet calls from the Brooklyn population. We also used three canyon wren and one 1300 hertz tone as control selections. These audio samples were cross-correlated with one another using Raven software (Cornell Lab of Ornithology) and the maximum correlation for each pair was extracted as a measure of similarity. These correlation values were used as a distance metric in a hierarchical cluster analysis (Ward's Method). The cluster dendrogram that resulted from this analysis found clear and discrete groupings that were best characterized in six clusters. The canyon wren vocalizations and artificial tone audio samples fell out as separate clusters indicating good clustering. The remaining parrot calls fell into 4 rather than the expected 2 clusters. This objective classification suggests that the existing subjective classification may mask twice as many natural types. The use of an objective classification may lead to deeper insights into monk parakeet social and communication behavior than previous studies. These results lead us to suggest that the communication system of monk parakeets is more complex than previously thought. The validity of this classification for monk parakeets will need to be established with field playback studies.

PSYC - 261 THE MORALIZATION OF CONSENT: A VALIDATION STUDY
Celia Florea (UG), Ana Gantman, Brooklyn College

The Gantman Lab explores moralization, the process by which preferences become moral values and its implications for perception, cognition and behavior. In two field experiments Gantman et al. (2018) tested how sexual consent is moralized by surveying two Eating Clubs on Princeton's campus. The questions were worded in subtle ways to get at the core elements of ideas expressed in the moral domain: Ideas thus moralized tend to be seen as black and white, matters of fundamental right and wrong; are perceived to be universal; and prompt agreement from one's peer group if not the wider culture. The present validation study will seek to show that these questions clearly measure moral thinking and correlate with face-valid measures of moral thinking (i.e. Is sexual consent a matter of fundamental right and wrong?). We will use the original survey questions where they fit (i.e. How responsible are you for preventing sexual assault?) with some questions adjusted for Amazon Mechanical Turk participants. We will compare these to two additional sets of questions about marital infidelity and online-dating. We predict based on prior ratings that questions about marital infidelity will fall squarely within the moral domain. Sexual consent is likely in flux, in the process of moralization. We think there will be some disagreement about consent and that differences will likely correlate with political orientation. We predict that questions of online-dating (matched for having to do with sex and relationships) will not fall within the moral domain, providing contrast to those clearly in or moving into the moral domain. This research has broad implications for how

issues like consent interventions should be carried out, and how groups within a community might respond to different approaches.
Support by NSF REU Award #1757560.

PSYC - 311 THE UNDERLYING MOTIVATIONS AND EMOTIONS EXPERIENCED BY UNIVERSITY STUDENTS WHEN IMAGINING THEIR FUTURE OCCUPATION.

Frayba Shirgul (GR), The Graduate Center of CUNY, Jacob Shane, Brooklyn College

How do university students envision their future day-to-day work lives? Despite this seemingly straightforward question little empirical research has addressed this question, especially from a psychological perspective. The goal of this study is learn how university students envision their future day-to-day lives with a particular focus on the underlying motivations and emotions present. To test the research question, online surveys were completed by university students at two large public universities, one in the greater Los Angeles area (n = 717) and one in the New York City area (n = 846). Responses were analyzed with Linguistic Inquiry and Word Count (LIWC), with a particular focus on underlying motivation and emotions expressed through these written responses. The results suggested that an implicit sense of achievement was the strongest motive present in the responses, followed by power motive, reward, affiliation, and then risk-aversion. While risk-aversion was only weakly reported, participants were much more likely to use tentative rather than certain words, suggesting hesitation regarding the career they chose and / or what a typical day in this occupation would consist of. Despite this uncertainty, participants were generally positive and optimistic, with positive emotion words over three times more likely to be used than negative emotion words. The study provides a unique insight into career-related psychological processes of university students. From an applied perspective, counselors could use this exercise to identify psychological barriers to career progress, such as uncertainty, anxiety, or the lack of underlying motivation for the chosen career.

PSYC - 312 STRUCTURAL ABNORMALITIES IN THE ORBITOFRONTAL CORTEX AND ITS ASSOCIATION WITH PSYCHOPATHIC TRAITS IN ADOLESCENTS

Yonglin Huang[1] (GR), Katlyn Schroder[1], Zoren Degtyarev[2], Bess Y. Lam[3], Yu Gao[2]
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[2]Brooklyn College
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The presence of externalizing behavior and psychopathic traits during youth are considered precursors to later criminal offending in adulthood. Individuals that exhibit these severe and chronic behavioral and personality characteristics account for over half the crime occurring in the United States by the time they are adults. Structural abnormalities in the brain, particularly in the frontal lobe, of incarcerated psychopaths have been well documented. However, the neural correlates underlying antisocial behavior and psychopathy in younger and nonclinical samples remain poorly understood. In this longitudinal study, preliminary structural brain imaging data from a small group of 12- to 14- year old healthy adolescents (n = 29) will be examined. Childhood psychopathic traits were reported by caregivers when the youth were 8- to 10- years old and at the MRI follow-up. Our results showed that the psychopathic traits significantly predicted later reduced (narcissism) and increased (impulsivity) gray matter volumes in the left lOFC, while the callous, uncaring and unemotional traits significantly predicted increased gray matter volumes in the right mOFC. These findings help us better understand the relationship between abnormalities in the brain (particularly in the OFC) and psychopathy in adolescence, which is essential to the designing and development of intervention measures in order to mitigate the occurrence of crime in adulthood.
Support by SC3GM118233 and SC1GM127243.

PSYC - 313 HOW DO GENDER NORMS IMPACT THE WAY WE VIEW OURSELVES? AN EXPLORATION OF GENDER AND SELF-ESTEEM

Enrica Bridgewater (GR), The Graduate Center of CUNY, Erika Y. Niwa, Brooklyn College

Gender norms have always existed in our society and it is no secret that they still exist today. From a young age, we are taught that in order to be accepted, we must adhere to the norms that correspond to our respective gender. However, what happens when a man fails to follow traditional masculine norms and a woman fails to follow traditional feminine norms? The gender role discrepancy strain (GRDS) asserts that a mismatch between how a man believes that men "should" act, and how he lives up to these expectations in his own life, can lead to a decline in self-esteem. Yet, research on the GRDS has primarily focused on men, with limited research on how it may affect women. We explored this potential conflict in both male and female undergraduates and hypothesized that a greater difference between how much one endorses and conforms to gender-specific norms will be negatively associated with one's self-esteem. One hundred and two undergraduate students (78 females and 24 males) participated in our study and took an online survey that asked them to report the extent to which they agreed or disagreed with gender-specific statements (e.g., "A man should always be the boss"), as well as statements related to self-esteem. Our findings show a positive relationship between the GRDS and self-esteem for women, but not for men ($r = .517$, $p < .01$; $r = .441$, $p < .01$). Women in our sample may believe that it is important to conform or even overconform to feminine norms, but men are not as concerned with being "manly enough". Further analyses will examine the GRDS in those who are gender nonconforming to see whether their experiences are similar to those in the present study.

PSYC - 314 EVIDENCE FOR SOCIAL LEARNING IN FIDDLER CRABS IN A LABORATORY SETTING

Richard Troise[1] (GR), Ezra Issacs[2], Frank W. Grasso[2]
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Fiddler crabs (Uca pugilator) are arthropods that maintain home burrows and use spatial memory to navigate daily between those burrows and feeding grounds. Eusocial arthropods (e.g. ants and bees) are known to navigate similarly to a communal nest using social cues. We studied the social but not eusocial fiddler crab in the laboratory to understand the extent to which its spatial learning is a general cognitive faculty. We placed 53 fiddler crabs in a round maze with a barrier opposite to the start location and measured their movements. At one end of the round maze was a conspecific tethered in place. We found that the crabs selected the correct side after 15 training trials and their total distance traveled declined over trials $F(2,80) = 6.03$ $p < 0.05$. This demonstrates they are capable of spatial learning to a non-burrow location on a time scale (about 4 hours) and that conspecifics are a suitable reward for fiddler crab learning. This may also be an example of social learning in the form of local enhancement.

PSYC - 315 CIVIC ENGAGEMENT AND ETHNIC IDENTITY DEVELOPMENT AMONG DIVERSE UNDERGRADUATE STUDENTS

Firdevs Gursoy (GR), The Graduate Center of CUNY, Erika Y. Niwa, Brooklyn College

Emerging adulthood is a distinct developmental period during which identity development is a key task (Arnett, 2000). In particular, extant research indicates that emerging adults are best equipped for positive outcomes if they achieve a positive sense of ethnic identity (Phinney, 2004). While ethnic identity is an important aspect of one's social identity, it is by no means the only piece of the puzzle. Civic engagement - civic attitudes, beliefs, interests, skills, and behavior - is a central focus of developmental science during

adolescence and emerging adulthood (Lerner & Boyd, 2012; Adler & Goggin, 2005). The present study focuses on the relationship between ethnic identity and civic engagement among Brooklyn College Undergraduates between the ages of 18 to 25 (N=100). Using the framework of emerging adulthood identity development (Arnett, 2000), we hypothesize that emerging adults who have successfully achieved a strong sense of ethnic identity will report higher levels of civic engagement. Participants were administered a survey which contained demographic questions, the Multi-Ethnic Identity Measure (Phinney,1992), and the Civic Engagement Scale (Doolittle & Faul, 2013). Multiple regression analysis was used to investigate whether ethnic identity predicts civic engagement over and above the effects of generational immigration status, age, gender, and income. Findings indicate that emerging adults who report a strong sense of ethnic identity are more civically involved ($F(5,87)=4.57$, $p<0.01$). In addition, males are more civically engaged compared to females ($B=3.63$, $p<0.05$).

PSYC - 316 A MODEL FOR THE MODULATION OF LEARNING BY SUMMED AND SEPARATE PREDICTION ERRORS

Fahd Alhazmi[1] (GR), Guillem Esber[1], Anjali Krishnan[1]
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Prediction error is a fundamental concept in many mental and psychological processes including learning, decision-making, and perception. Theoretical accounts of learning assume that any learning episode is influenced by prediction error signal. While most influential models of learning assume that prediction errors associated with different cues integrate by summation (e.g., Rescorla & Wagner, 1972), several behavioral experiments suggest that prediction error calculations may involve an independent signal: a separate prediction error signal. The consistent violations for the summed prediction error paradigm have been reported both in rats and in humans and across different experimental settings. The effect of how those two forms of prediction error signals interact and integrate during learning has not yet been completely understood. Here, we aim to provide a mathematical model and suggest a biologically plausible account for the mechanisms by which the two prediction errors are processed and integrated. We use the model to simulate multiple behavioral experiments and show that the model can account for a wide array of findings, that proved difficult for many other influential models. Insights from these mechanisms will enable us to understand how high-level cognitive functions can be modulated by the low-level sensory evidence and provide a framework to compare neurological disorders that exhibit dysfunctional prediction error learning such as schizophrenia and Autism Spectrum Disorder (ASD).

PSYC - 317 A PSYCHOPHYSIOLOGICAL STUDY OF MORAL DECISION-MAKING IN ADOLESCENTS

Catherine Chan[1] (GR), Scott Koenig[1], Melissa Huang[1], Liat Kofler[1], Katlyn Schroder[1] , Eva Santucci[1], Yu Gao[2]
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Studies of the neurodevelopment of morality suggest that from childhood to adulthood, responses to emotionally arousing social situations, such as seeing other people in distress, shift from the close monitoring of somatovisceral activity to more cognitive, higher-level emotion processing. However, the role of autonomic nervous system activity in this developmental trend remains unclear. Heart rate variability, for example, is a psychophysiological measure that is thought to represent the function of the neural networks involved in emotion-cognition interactions. Previous research in adults has shown that low heart-rate variability predicts utilitarian, or emotionally blunted, responses to moral dilemmas. Yet it

is unknown whether this association between heart rate variability and moral decision-making is different in adolescents, who, as previous studies suggest, may have underdeveloped neuro-visceral connections relative to adults. This ongoing longitudinal study uses a moral decision-making paradigm that has been adapted for adolescents along with various measures of autonomic nervous system activity to investigate the changing role of emotion in morality in adolescents. Preliminary analyses have revealed that during moral dilemmas that are emotionally arousing, but not during less-emotional moral dilemmas or nonmoral questions, higher heart-rate variability predicts increases in response time. This indicates that heart-rate variability may serve as an index of the extent to which emotional information is integrated into the moral decision-making process. Plans for analyses of the roles of personality, demographic factors, and other psychophysiological measures in adolescent moral decision-making will be discussed.

PSYC - 318 IS THERE A MISIDENTIFICATION OF NEUTRAL FACES IN HIGH ANXIETY AND HIGH PSYCHOPATHIC INDIVIDUALS?

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Previous research has demonstrated that highly anxious individuals classify ambiguous emotional expressions along the continua of surprise, fear and sadness as fearful compared to low-trait anxious participants (Richards, French, Calder, Webb, Fox & Young, 2002). High levels of anxiety are also associated with certain facets of psychopathy (Schultz, Balderston, Baskin-Sommers, Larson, & Helmstetter, 2016), however prior studies have focused more on the negative bias in anxiety alone as opposed to comorbid psychopathy and anxiety. The objective of this study was to examine emotion recognition in those who exhibit traits of psychopathy and have high or low anxiety. Participants (N=100) completed the Psychopathic Personality Index-Revised(PPIR), State Trait Anxiety Index (STAI) and an emotion recognition task with free gaze and cued conditions. We predicted an interaction between psychopathy and anxiety such that individuals with high levels of psychopathic traits and high levels of anxiety would classify neutral faces as negative. Contrary to our hypothesis, we found no interaction, nor did trait anxiety predict a negative bias towards classifying neutral faces as negative. One reason for this finding could be related to the sample being nonclinical. Future studies should include individuals with other psychiatric diagnoses to determine if the negative bias spans other disorders; if so, therapeutic strategies such as CBT could be used to help mitigate emotion recognition issues much like they do for individuals with anxiety.

PSYC - 319 "EVERYTIME I HEAR A SIREN, I WONDER 'WHAT BLACK PERSON DIED TODAY': MOTHERING WHILE BLACK, A QUALITATIVE ANALYSIS

Camille Lester (GR), The Graduate Center of CUNY, Erika Y. Niwa, Brooklyn College

Previous research shows motherhood is cultural, situated, and complex, deeply informed by one's identity and there has been a lack of developmental research recognizing the diversity within motherhood without measuring perceived differences to a white, middle-class standard. How can claims that "mothers are", "mothers believe", and "mothers need" be made when claims are inapplicable or unresponsive to the needs, interests, and experiences of all mothers? This pilot study utilized semi-structured interviews (n=5) to explore the intimate dimensions of motherhood such as surveillance, perceptions of law enforcement, and the situatedness of identity among five Black mothers from the Midwest. Utilizing grounded theory and critical discourse analysis, there were three major findings. Firstly, Black motherhood is intersectional or moreover, subjectivities of identity (i.e. Blackness, class, age, gender) are embedded and interlaced; one does not exist without the other(s). Secondly, police and law enforcement do not always equate

safety—but instead feelings of fear, anxiety, and somatic pain. Lastly, hope and motherwork or, "working for the day to come" (Collins, 1994), is at the bedrock of Black motherhood. These findings illustrate the need to further examine how the act of mothering is shaped by race, culture, and identity—while simultaneously underscoring the dire need for such research. Based on the findings from this pilot study, a larger study in Harlem investigating similar questions is being conducted.

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LEGEND:	**BIOL** - Biology	**HNS** - Health & Nutrition Science
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	CIS - Computer Information Science	**PSYC** - Psychology
	EES - Earth & Environmental Science	