

13th Annual Neuropsychology Research Day



Keynote Speaker:

Cristina Alberini, Ph.D.

Professor at the Center for Neural Science,
New York University, New York, NY

“Biological Mechanisms Underlying Memory Consolidation and Enhancement”

1:10-2:15

September 18, Friday, 2015

9:30 AM – 4:30 PM

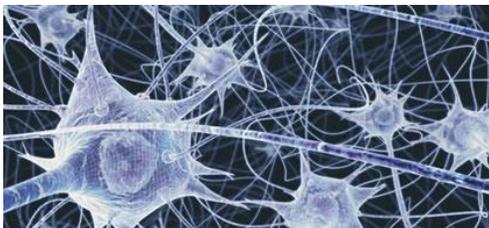
Rosenthal Library Auditorium, Rm 230

Queens College, CUNY

Behaviors to Neurons

Neurons to Behaviors

Somatosensation
A New Model for Dopamine
Neural Plasticity
Learning & Memory
Sensory Processing
Vision
Feeding Behaviors
Attention
Attachment
Drugs of Addiction
Developmental Disabilities
ADHD
Huntington's Disease Models
Depression
Epigenetics



For questions or more information
please contact Dr. Carolyn Pytte
Carolyn.Pytte@qc.cuny.edu

**Thirteenth Annual
Neuropsychology Research Day
at Queens College
September 18, 2015**

9:30 **Program Announcements: Carolyn Pytte, Ph.D.**
Associate Professor
Psychology Department, Queens College
& The Graduate Center, CUNY

Session I: 9:35-10:50

Moderator: Tamar Kraft
Doctoral Student, Neuropsychology
The Graduate Center & Queens College, CUNY

9:35-9:50 **The Neural correlates of motion within the rodent sensory barrel cortex.** *Adesh Bajnath¹, Joshua Brumberg, Ph.D.^{1,2}*,
¹Neuroscience-Biology PhD Subprogram, The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY.

9:50-10:05 **Does NMDA antagonism differentially effect the acquisition of fructose- and sucrose-CFP in BALB/c and SWR mice?**
Tamar Kraft¹, D. Huang¹, M. Lolier¹, S. Lamagna¹, D. Warshaw¹, E. Natanova¹, O. Vaknin¹, A. Sclafani, Ph.D.^{2,3}, R.J. Bodnar, Ph.D.^{1,3}, ¹Psychology, Queens College, CUNY, Flushing, NY; ²Psychology, The Graduate Center, CUNY, New York, NY; ³Psychology, Brooklyn College, CUNY, Brooklyn, NY.

10:05-10:20 **Behavioral and pharmacological approaches as potential treatments for heroin seeking in rat models.** *Ewa Galaj¹, Monica Manuszak², Sandra Babic², Sam Ananthan³, Robert Ranaldi, Ph.D.^{1,2}*,
¹The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY; ³Southern Research Institute, AL.

10:20-10:35 **Chronic nicotine-induced adaptation mediated by NR2B NMDA receptors in corticostriatal plasticity.** *Jianxun Xia¹, M.D. Ph.D., Jeff Beeler, Ph.D.^{1,2}*, ¹Queens College, CUNY; ²The Graduate Center, CUNY.

10:35-10:50 **Effects of mild simulated visual impairment on perception of oriented patterns.** *Byron Johnson¹, Silvia Calderon¹, Kimberly Paredes², Bryan Richgruber³, Ayesha Shahab³, Monika Devi⁴, Zena Dakmak⁵, Deborah Watman⁶, and Andrea Li, Ph.D.⁷*, ¹Behavioral Neuroscience Master's Program, ²General Psychology Master's Program, ³Psychology Major, Queens College, ⁴History Major, Brooklyn College, ⁵Neuroscience Major, ⁶Urban Studies Major, ⁷Psychology Department.

10:50-11:00 Coffee Break

Session II: 11:00-12:15

Moderator: Alice Perez

**Doctoral Student, Clinical Neuropsychology
The Graduate Center & Queens College, CUNY**

11:00-11:15 **Huntington's disease transgenic rat models demonstrate an altered association between hippocampal neurogenesis and measures of temporal discrimination compared with wild type controls.** *Alice Perez¹, J. Fischetti², D. Garces¹, J. Rojas², C. Tsisiris¹, B. Brown, Ph.D.^{1,2}, N. Hemmes, Ph.D.^{1,2}, C. Pytte, Ph.D.^{1,2}*, ¹Clinical Psychology at Queens College, The Graduate Center, CUNY; ²Psychology Department, Queens College.

11:15-11:30 **Attention in Alzheimer's disease: detecting response to cholinesterase inhibitors.** *Clara Vilacastelar¹, Nancy Foldi, Ph.D.^{1,2}*, ¹Clinical Psychology at Queens College, The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY;

11:30-11:45 **Breathe in, breathe out: A mindfulness-based approach to counter cognitive decline associated with smoking cessation.** *Farah Goheer, M.A.¹, Renee Goodwin, Ph.D.^{1,2}*, ¹Clinical Psychology at Queens College, The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY.

11:45-12:00 **The relationship between low birth weight, preterm birth, and adult health. Do childhood neighborhoods matter?** *Beatriz Nunez¹, Madina Nayl¹, Valentina Nikulina, Ph.D.^{1,2}*, ¹Psychology

Major, Psych. Department, Queens College, CUNY; ²The Graduate Center, CUNY.

12:00-12:15 **Child reactivity: Relationships between temperament and skin conductance responses to startle.** *Jessica Buthmann*¹, *Yoko Nomura, Ph.D.*^{2,3}, ¹Masters in Behavioral Neuroscience, Queens College, CUNY; ²Psychology Department, Queens College, CUNY; ³The Graduate Center, CUNY.

12:15 **Announcement: QC Association of Neuropsychology Students in Training (ANST) Interest Group.** *Louisa Thompson, M.Phil.* Doctoral Candidate, Clinical Neuropsychology, The Graduate Center, CUNY. <http://qcanst.weebly.com>

12:20-1:10 Lunch

Session III: Keynote Address

1:10-2:15 Words of Welcome: Richard Bodnar, Ph.D.
Dean of Research and Graduate Studies, Queens College

Introduction of Keynote Speaker: Nancy Foldi, Ph.D.
Professor, Psychology Department, Queens College

Keynote Address: Cristina Alberini, Ph.D.
Professor at the Center for Neural Science, New York University
“Biological Mechanisms Underlying Memory Consolidation and Enhancement”

2:15-2:30 Break

Session IV: 2:30-4:30

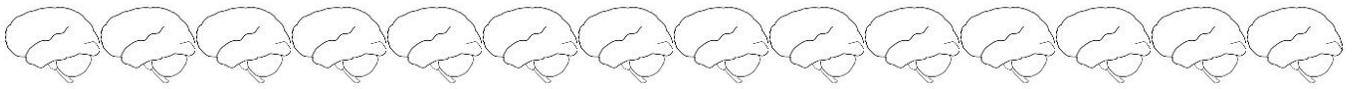
Moderator: Amanda Zwilling
Doctoral Student, Clinical Neuropsychology
The Graduate Center & Queens College, CUNY

2:30-2:45 **You are the danger: Brain responses to aversive stimuli in methamphetamine addiction.** *Jennifer L Stewart, Ph.D.*, The

Graduate Center, CUNY; Psychology Department, Queens College, CUNY.

- 2:45-3:00 **The neuropsychology of chess: Sometimes a pawn is just a pawn.** *Daniel Saldana*¹, *Jeff Motter*¹, *Joel Sneed, Ph.D.*^{1,2}, ¹The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY.
- 3:00-3:15 **Cognitive abnormalities in systemic lupus erythematosus: Investigating spatial and relational memory.** *Simran Kang*¹, *Justin Storbeck, Ph.D.*^{2,3}, ¹Masters in Behavioral Neuroscience, Queens College, CUNY; ²Psychology Department, Queens College, CUNY; ³The Graduate Center, CUNY.
- 3:15-3:30 **Electrophysiological markers for executive control-emotion interactions: Implications for depressive disorders.** *Aliza Schwartzblatt*¹, *Kathryn Dana*¹, *Justin Storbeck, Ph.D.*^{1,2}, *Jennifer Stewart, Ph.D.*^{1,2}, ¹The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY.
- 3:30-3:45 **Baseline characteristics of a combination treatment trial for mild cognitive impairment with depression.** *Jeff Motter*¹, *Davangere Devanand*², *P. Murali Doraiswamy*³, *Joel Sneed, Ph.D.*^{1,3,4}, ¹The Graduate Center, CUNY; ²Columbia University and the New York State Psychiatric Institute, ³Duke University, ⁴Psychology Department, Queens College, CUNY.
- 3:45-4:00 **Emotion processing as a predictor of child physical abuse perpetration.** *Amanda Zwilling*¹ & *Valentina Nikulina, Ph. D.*^{1,2}, ¹The Graduate Center, ²Psychology Department, Queens College, CUNY.
- 4:00-4:15 **SSRIs may not be the most “attractive” way to treat anxiety and depression: How antidepressants affect romantic attraction.** *Carly Tocco*¹, *Claudia Brumbaugh, Ph.D.*^{1,2}, ¹The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY.
- 4:15-4:30 **Impact of neurodevelopmental genes on the trajectory of ADHD severity, a pilot study.** *Agnieszka E. Mlodnicka*¹, *Yoko Nomura, Ph.D.*^{1,2}, *Yasmin Hurd, Ph.D.*³, and *Jeffrey M. Halperin, Ph.D.*^{1,2},

¹The Graduate Center, ²Psychology Department, Queens College, CUNY, ³The Icahn School of Medicine at Mount Sinai, NY.



ABSTRACTS

The Neural correlates of motion within the rodent sensory barrel cortex. *Adesh Bajnath¹, Joshua Brumberg, Ph.D.^{1,2}, ¹Neuroscience-Biology Ph.D. Subprogram, The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY.*

The ability to detect sensory stimuli plays a critical role in the survival of any animal. For the nocturnal rodent, the task of detecting tactile sensory stimuli in order to guide navigation through its environment is accomplished by an array of whiskers on the animal's mystacial pad. This entire array is mapped topographically within the somatosensory cortex (S1) of the rodent brain and forms a sensory map. Within S1, there are clusters of neurons known as 'barrels' which correspond topographically to the spatial organization of whiskers in a one-to-one fashion. To investigate how the rodent barrel cortex encodes features of a moving stimulus across the animal's whisker pad, we utilized a novel programmable whisker stimulator that allows us to present controlled moving stimuli in either the forward or backward direction at different speeds to an anesthetized mouse. Stimuli consisted of a smooth drum and a textured drum of identical diameter with repeating grooves ~3mm wide. Video recordings indicate that many of the caudal (Arcs 1-3) whiskers are engaged by our stimulus. When the stimuli were presented, both drums drove cortical neurons to fire; responses to the textured stimulus resulted in increased neural firing when compared to the responses of the smooth stimulus. There is adaptation throughout the duration of the stimulus in both the smooth and textured conditions and rates of adaptation varied with stimulus speed. Barrel neurons displayed preferences for specific speeds, texture and motion in one direction versus the other. Our results suggest that mouse barrel cortex processes motion information at the early stages of cortical processing.

Does NMDA antagonism differentially effect the acquisition of fructose- and sucrose-CFP in BALB/c and SWR mice? *Tamar Kraft¹, D. Huang¹, M. Lolier¹, S. Lamagna¹, D. Warshaw¹, E. Natanova¹, O. Vaknin¹, A. Sclafani, Ph.D.^{2,3}, R.J. Bodnar, Ph.D.^{1,3}, ¹Psychology, Queens College, CUNY, Flushing, NY; ²Psychology, The Graduate Center, CUNY, New York, NY; ³Psychology, Brooklyn College, CUNY, Brooklyn, NY.* Appetitive learning is typically modulated by glutamatergic systems.

In rats, the acquisition, but not expression, of sugar-conditioned flavor preferences (CFP) is eliminated by systemic N-methyl-D-aspartate (NMDA) receptor antagonism (MK-801). Genetic variance has been observed in sugar-CFP in inbred mouse strains. In addition, sugar-conditioned preferences in SWR and BALB/c mice are differentially sensitive to opioid and dopamine D1 receptor antagonism. The present study determined if there are strain differences in the ability of the NMDA antagonist MK-801 to block sugar-CFP in SWR and BALB/c mice. In Experiment 1, mice received vehicle (0.9% saline) or MK-801 (100 ug/kg, ip) 30 min prior to each of 10 alternating one-bottle training trials (1 h) with a flavored (e.g., cherry, CS+) 8% fructose + 0.2% saccharin solution or a differently-flavored (e.g., grape, CS-) 0.2% saccharin solution. Six 2-bottle preference tests were then conducted with both CS+ and CS- flavors presented in the 0.2% saccharin solutions without drug injections. Whereas BALB/c mice receiving vehicle displayed significant fructose-CFP (82%), BALB/c mice receiving MK-801 failed to develop a preference (47%). In contrast, MK-801 treatment in SWR mice (81%) only slightly reduced the acquisition of the fructose-CFP compared to vehicle-trained counterparts (92%). In Experiment 2, SWR and BALB/c were tested for the acquisition of sucrose-CFP (CS+: 16% sucrose; CS-: 0.05% saccharin) in a similar paradigm. BALB/c mice trained with MK-801 (49%) failed to display significant sucrose-CFP relative to vehicle-trained BALB/c mice (80%). In contrast, acquisition of the sucrose-CFP failed to differ in SWR mice trained with vehicle (88%) or MK-801 (77%). Thus, BALB/c mice, like outbred rats, rely upon NMDA receptor signaling for learning a sugar-CFP elicited by sucrose or fructose. In contrast, acquisition of sugar-CFPs in SWR mice was not blocked by MK-801 treatment, indicating genetic variance in NMDA control of these conditioned preferences.

Behavioral and pharmacological approaches as potential treatments for heroin seeking in rat models. *Ewa Galaj¹, Monica Manuszak², Sandra Babic², Sam Ananthan², Robert Ranaldi, Ph.D.^{1,2}, ¹The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY.* One of the major problems in heroin addiction is a high rate of relapse. Despite years of intensive research, there is no effective pharmacological or behavioral treatment that promotes long-term abstinence and protects against relapse. Heroin-related cues can trigger cravings and relapse in addicts or heroin seeking in rats. Thus, in the present study we investigated ways in which the effect of heroin cues to reinstate heroin seeking in rats could be diminished. Experiment 1 involved a pharmacological approach with D3 receptor antagonism. Rats were trained to self-administer intravenous heroin for 15 days before beginning an extinction phase during which animals had no access to heroin.

Following extinction a cue-induced reinstatement test was conducted where animals were treated with one of several SR 21502, a selective dopamine D3 receptor antagonist, doses (0, 7.5, 10 or 15 mg/kg) and tested for responding to heroin-conditioned cues. Experiment 2 involved a behavioral approach such that rats that already acquired the heroin self-administration habit, were housed in an enriched or non-enriched environment, underwent extinction and later were tested for cue-induced reinstatement of heroin seeking. The results of Experiment 1 showed a significant dose-related reduction in cue-induced reinstatement of heroin seeking. The results of experiment 2 showed that exposure to an enriched environment reduced responding during the reinstatement test. Our findings suggest that DA D3 receptor antagonism as well and environmental enrichment can be effective approaches to diminish the effects of heroin cues on heroin seeking.

Chronic nicotine-induced adaptation mediated by NR2B NMDA receptors in corticostriatal plasticity. *Jianxun Xia¹, M.D. Ph.D., Jeff Beeler, Ph.D.^{1,2}, ¹Queens College, CUNY; ²Psychology PhD Program, The Graduate Center, CUNY.* Nicotine addiction is a chronic psychological disorder and is easy to relapse despite prolonged abstinence. Nicotine exposure-induced corticostriatal synaptic plasticity change has been suggested to play an important role in the development of its addictive behaviors. In present study, we used whole-cell patch clamp recording technique to investigate the effect of chronic nicotine (cNIC) treatment on long-term depression (LTD) in D2 receptor-expressing medium spiny neurons in striatopallidal indirect pathway. Our results demonstrated that chronic oral intake of nicotine solution (100 µg/ml, 21 days) induced a significant loss of LTD and a long-term potentiation (LTP) in dorsal striatum. The LTD was partially rescued by D2 agonist Quinpirole and NMDA receptor antagonist APV, which suggested the impairment of LTD and appearance of LTP is D2- and NMDAR-dependent. Further study revealed that cNIC-induced synaptic plasticity change occurred at pre-synaptic sites, as paired-pulse ratio (PPR) was reduced and was restored by Quinpirole but not APV. Meanwhile, the AMPA/NMDA ratio was greatly reduced in cNIC group compared with control group at a holding potential of +40 mV, and this ratio by dividing AMPA EPSC amplitude at -70 mV by NMDA EPSC amplitude at +40 mV was also reduced after high-frequency stimulation, which collectively indicated that cNIC treatment caused postsynaptic alteration. In addition, NMDAR I-V curve was modified by cNIC, as the current amplitude at holding potential -40, -20, and +40 mV was significantly larger than control group, which was blocked by NR2B antagonist Ro 25-6981. Time course of NMDAR EPSC amplitude in cNIC group showed a greater reduction in response to Ro 25-6981 compared to control group.

Taken together, these findings have demonstrated that NR2B NMDA receptor upregulation upon cNIC exposure might be involved in LTD/LTP conversion.

Effects of mild simulated visual impairment on perception of oriented patterns.

Byron Johnson¹, Silvia Calderon¹, Kimberly Paredes², Bryan Richgruber³, Ayesha Shahab³, Monika Devi⁴, Zena Dakmak⁵, Deborah Watman⁶, and Andrea Li, Ph.D.⁷, ¹Behavioral Neuroscience Master's Program, ²General Psychology Master's Program, ³Psychology Major, ⁴History Major, Brooklyn College, ⁵Neuroscience Major, ⁶Urban Studies Major, ⁷Psychology Department. Visual impairment is reduced vision that results from aging, disease, or injury that cannot be corrected by corrective lenses or surgery. With an aging population, there is a greater prevalence of, and thus growing interest in understanding, visual impairment. We aim to understand how visual impairment affects the way individuals visually perceive objects and how it thus affects interaction with the environment. The brain is well equipped to perceive the orientation, or tilt, of object boundaries in the visual field. Any condition of visual impairment that affects orientation or tilt perception will thus influence object perception in general. We explore the effects of simulated low vision conditions on tilt perception in individuals with normal or corrected-to-normal vision. Using image processing techniques, equivalently mild levels of two forms of impairment, blur and contrast reduction, are applied to oriented stimuli of different spatial frequencies. Impaired and unimpaired stimuli will be presented psychophysically to quantify sensitivity to tilt under normal and impaired conditions. Preliminary results suggest that mild blur has little or no effect on tilt sensitivity, but equivalently mild levels of contrast reduction (commonly resulting from conditions such as cataracts) increase tilt thresholds by a factor of 2. An understanding of how different impairments influence underlying visual thresholds can contribute to an understanding of how they will affect perception of objects in real visual scenes. Results could lead to the development of devices and/or apps that could enhance vision for an individual based specifically on their particular visual loss.

Session II

Huntington's disease transgenic rat models demonstrate an altered association between hippocampal neurogenesis and measures of temporal discrimination compared with wild type controls. *Alice Perez¹, J. Fischetti², D. Garces¹, J. Rojas², C. Tsisiris¹, B. Brown, Ph.D.^{1,2}, N. Hemmes, Ph.D.^{1,2}, C. Pytte, Ph.D.^{1,2}, ¹Clinical Psychology at Queens College, The Graduate Center, CUNY; ²Psychology Department, Queens College.* Alterations in adult neurogenesis commonly occur in

neurodegenerative diseases including Parkinson's disease, Alzheimer's disease, and Huntington's disease (HD). For instance, the recruitment of new neurons into the striatum is upregulated in mouse models of HD, and is reduced in the piriform cortex and hippocampus. The hippocampus plays a role in the formation of declarative memories, functions in spatial navigation, and also processes timing information permitting temporal discrimination of events. Interestingly, hemispheric differences in the structure and function of the hippocampus in healthy individuals has been associated with improved cognitive ability and plays a role in memory. However, surprisingly, interhemispheric differences in adult neurogenesis have not yet been studied. Here we examined the relationship between bilateral hippocampal neurogenesis and measures of temporal discrimination in a transgenic Huntington's disease (tgHD) rat model. Temporal discrimination was measured using a peak interval testing paradigm in which animals respond by a lever press to a signal of one temporal duration, and we measure changes in rates of responding across the fixed interval. We divided the peak rate of lever press responding by the average smoothed response rate producing a ratio. Ratios equal to 1 indicate a lack of temporal discrimination (i.e., animals respond at a steady same rate throughout the interval). Ratios greater than 1 indicate stronger temporal discrimination (animals responded at higher rates at the remembered time of reinforcement, or peak time, relative to rates throughout the entire PI interval). New neurons were labeled with antibody to the neuron-specific protein doublecortin and numbers of new neurons were compared with behavior. We found that in wild-type (WT) rats, the degree of left side lateralization of new neurons was positively correlated with accuracy of temporal discrimination. Total numbers of new neurons in the left, right, or combined hippocampi were not correlated with discrimination. On the contrary, there was no correlation in tgHD rats between the degree of lateralization in new neurons and discrimination. Instead, success in temporal discrimination was correlated with absolute values of new neurons in the left hemisphere, both hemispheres combined, and there was a trend in the right hemisphere. We propose that tgHD rats have altered inter-hemisphere processing, resulting in asymmetric relationships between new neurons and performance.

Attention in Alzheimer's disease: detecting response to cholinesterase inhibitors. *Clara Vila Castelar*¹, *Nancy S. Foldi, Ph.D.*^{1,2}, ¹*Clinical Psychology at Queens College, The Graduate Center, CUNY;* ²*Psychology Department, Queens College, CUNY.*

Objective: Cholinesterase inhibitors (AChE-I) remain the foremost treatment of Alzheimer's disease (AD). While efficacy has been documented in large groups,

effect sizes are small, treatment times are long confounding drug response and disease progression, and global measures (aggregating multiple cognitive domains) lack specificity. Acetylcholine is a known modulator of attention from animal models, yet no human study has used attentional measures to assess AChE-I efficacy in patients with AD. We therefore hypothesized that attentional functions of speed and accuracy (particularly performance under increased load), orienting, and variability could detect drug efficacy after a short treatment, while global and other domain-specific cognitive measures could not detect a treatment effect.

Participants and Methods: 23 newly diagnosed patients with AD participated in a longitudinal randomized double-blind placebo-controlled trial. All participants were tested at baseline (T1), randomized into Drug (N=12; donepezil 10mg) and Placebo (N=11) groups, and retested after approx. ~6 weeks (T2) after drug steady state was reached. Tests included a) global measures of Alzheimer's Disease Assessment Scale-cognitive subscale (ADAS-Cog), Dementia Rating Scale (DRS-II) and Mini-Mental State Examination (MMSE), and b) domain tasks of memory, language, visuo-spatial, and executive function and c) three attention tasks: 1) Foreperiod Effect Task (SRT): response time (RT) and RT variability under varied load; 2) Covert Orienting (COV): RT of valid, neutral, and invalid cues across 5 trial blocks; 3) Attentional Blink (AB): accuracy of top-down, guided search under varied load. Non-parametric Wilcoxon signed-rank tests were applied.

Results: The Drug, compared to the Placebo, group decreased variability under conditions of high load (SRT; shortest SOA-350ms), resisted effects of fatigue (COV and SRT), and maintained accuracy under high load (AB, SOA-266ms). Global or domain-specific tests did not detect treatment change.

Summary: Together, these findings support our hypothesis that attentional measures were better able to detect change of the cholinergic augmentation in AD after only 6 weeks, while global measures and domain-specific measures did not.

Breathe in, breathe out: A mindfulness-based approach to counter cognitive decline associated with smoking cessation. *Farah Goheer, M.A.¹, Renee Goodwin, Ph.D.^{1,2}, ¹Clinical Psychology at Queens College, The Graduate Center, CUNY; ²Psychology Department, Queens College, CUNY.* In the 20th century alone, an estimated 100 million people have died from smoking-related illnesses world-wide and the number could increase to one billion during this 21st century unless urgent action is taken. A large body of literature suggests that nicotine administration enhances cognitive functioning, particularly in the areas of attention and working memory via the cholinergic system. Thus, an important factor to consider in smoking persistence and relapse is the use of tobacco to maintain the enhancing effects of

nicotine on cognitive functioning. However, current smoking cessation interventions fall short of targeting cognitive decline associated with quitting smoking. Thus, the implementation and evaluation of an intervention that effectively combats cognitive decline is crucial to facilitating smoking cessation and reducing relapse rates. Accumulating evidence suggests that mindfulness meditation, even brief training, enhances cognitive skills including working memory and attention. Thus, this presentation will focus on a review of the current literature studying the effects of both nicotine and mindfulness meditation on cognitive functioning and the potential utility of a mindfulness meditation smoking cessation intervention.

The relationship between low birth weight, preterm birth, and adult health. Do childhood neighborhoods matter? *Beatriz Nunez¹, Madina Nayl¹, Valentina Nikulina, Ph.D.^{1,2}, ¹Psychology Major, Psych. Department, Queens College, CUNY; ²The Graduate Center, CUNY.* Many Americans living with major health conditions such as hypertension, diabetes, obesity and asthma can trace the origins of their illness back to childhood. It is important to identify links between childhood risk factors and these health conditions in order to develop effective prevention strategies. Research studies have found that premature birth and low birth weight are associated with poorer health outcomes for some individuals while others do not manifest negative health consequences. In order to better understand these discrepancies in health outcomes, the current study will assess whether disadvantaged childhood neighborhoods pose an additional risk for the development of physical illness for children born prematurely and with low birth weight. To answer this research question data from the “Pathways to Adulthood: A Three Generation Urban Study,” which followed a cohort of children in Baltimore, Maryland, from birth into early adulthood, will be used.

Child reactivity: Relationships between temperament and skin conductance responses to startle. *Jessica Buthmann¹, Yoko Nomura, Ph.D.^{2,3}, ¹Masters in Behavioral Neuroscience, Queens College, CUNY; ²Psychology Department, Queens College, CUNY; ³The Graduate Center, CUNY.* In this study we explore the relationship between infant temperament and childhood psychophysiological reactivity. Temperament is a relatively stable trait across the lifespan from infancy to adulthood, reflecting individual reactivity and emotion regulation. Electrodermal activity (EDA) is a direct measure of sympathetic nervous system activity that has been linked to emotional reactivity as well as lifetime psychopathology. Using pilot data from 130 participants in the Stress in Pregnancy study, we analyzed EDA data recorded from children ages 18-60 months during a startle probe paradigm. Several

subscales of temperament as measured by the Infant Behavior Questionnaire (IBQ) at 6-12 months of age significantly predicted the amplitude of specific skin conductance responses to the startle paradigm, although there were marked gender differences. Specifically, the amplitudes of skin conductance responses specific to 90 dB startle probes were predicted by duration of orienting, low intensity pleasure, and rate of recovery from distress for boys, and by soothability and approach/excitement for girls. These initial findings could be viewed as the first step toward uncovering the underlying mechanism of the development of psychopathology via pathophysiological reactivity over time. If future studies confirm the further associations between reactive temperament and psychopathology, we could evaluate the predictive value of EDA levels as markers for vulnerability, and EDA responses for future psychopathology.

Session IV

You are the danger: Brain responses to aversive stimuli in methamphetamine addiction. *Jennifer Stewart, Psychology Department, Queens College, CUNY; The Graduate Center, CUNY.* Drug-addicted individuals often make drug-taking decisions when they do not feel well. Yet, few studies have examined the influence of an aversive state on decision-related neural processing. The present study investigated brain activation to decision-making during an aversive interoceptive challenge in recently abstinent individuals with methamphetamine use disorder (METH) and healthy comparison subjects (CTL) using functional magnetic resonance imaging (fMRI). Participants performed a two-choice prediction task at three fixed error rates (ER; 20% = reward, 50% = uncertainty, 80% = punishment) while anticipating and experiencing episodes of inspiratory breathing load during fMRI. Results showed that METH exhibited higher trait anxiety in conjunction with lower anterior insula (AI) and inferior frontal gyrus (IFG) activation than CTL across trials. METH also showed lower posterior insula (PI) and anterior cingulate cortex (ACC) activation than CTL during breathing load independent of ER. For the crucial ER by interoception interaction, METH displayed lower ACC activation to punishment than CTL during breathing load. Within METH, lower trait anxiety was linked to AI/IFG attenuation across trials. AI/IFG attenuations in METH are suggestive of an executive functioning deficit, particularly in users with low anxiety, reflecting reduced resources allocated to choice selection. In contrast, PI/ACC reductions in METH appear specific to impairments in registering and evaluating interoceptive experiences. Taken together, inadequate activation of brain areas that are important for regulating when one does not feel well may be the neural basis for poor decision-making by METH.

The neuropsychology of chess: Sometimes a pawn is just a pawn. *Daniel Saldana*¹, *Jeff Motter*¹, *Joel Sneed, Ph.D.*^{1,2}, ¹*The Graduate Center, CUNY;* ²*Psychology Department, Queens College, CUNY.* ADHD is a chronic neurodevelopmental disorder that is prevalent in as much as 9% of school-aged children (Pastor & Reuben, 2008). Halperin and Healey (2011) review a burgeoning literature of underlying neural determinants of ADHD alongside research demonstrating the powerful effect of environmental influences on brain development and functioning. Current evidence based treatments for ADHD center around medication and behavior modification. Structural MRI and fMRI imaging studies form a convincing case for neurodevelopmental differences between individuals with and without ADHD—these studies have focused both on specific brain regions and on networks of regions such as DFN (Default Mode Network) (Castellanos et al., 2002; Schulz et al., 2005; Schilback et al., 2008). Further, neuropsychological findings have provided clear evidence of impairments in a multitude of neurocognitive domains in children with ADHD that include but are not limited to attention, working memory, set shifting, planning, etc. Being that chess studies have associated chess play with the exercise of various cognitive processes similar to the ones affected by ADHD (Amidzic et al., 2001; Onofrij et al., 1995; van der Maas et al., 2005, and Wan et al., 2011), the study plans to assess the feasibility of using chess training as an effective platform for investigating the potential to ameliorate cognitive deficits in children with ADHD. Further, chess may have potential social benefits stemming from interaction with other children and teachers that address environmental deficits that cannot be addressed in traditional pharmacological and psychological treatments. Recruiting twenty school-aged children with ADHD, we plan to meet with students and their families for weekly sessions for 12 weeks. In addition to screening/diagnostic measures, children will be tested to assess changes in neurocognitive functioning prior to and following training. Results from this study will be used to inform a larger randomized control trial involving an active control condition.

Cognitive abnormalities in systemic lupus erythematosus: Investigating spatial and relational memory. *Simran Kang*¹, *Justin Storbeck, Ph.D.*^{2,3}. ¹*Masters in Behavioral Neuroscience, Queens College, CUNY;* ²*Psychology Department, Queens College, CUNY;* ³*The Graduate Center, CUNY.*

Objective: Systemic Lupus Erythematosus (SLE) is associated with deficits in attention, executive functioning, visuospatial functions, and memory. Individuals with SLE have shown marked impairment on the Rey Complex Figure Test (RCFT), but mechanisms underlying poor performance have not yet been elucidated. The

goal of this study was to explain performance on the RCFT through associated performances on other measures of cognition and qualitative analysis of individual components of RCFT performance.

Subjects and Methods: Eighteen individuals with SLE (17 F, 1 M; age = 42 ± 10.77 years) completed the RCFT, Trailmaking Test (TMT), and Judgment Line Orientation (JLO). The RCFT performances were scored and normed using the standard method and the Boston Qualitative Scoring System (BQSS). TMT, JLO, and BQSS scores were used as predictor variables in a regression model.

Results: RCFT copy trial performance positively correlated with TMT A and BQSS scores on configural presence, cluster accuracy, neatness, and perseveration. These variables together predicted RCFT copy performance ($R = .94$, $r^2 = .89$, $p. < .01$), but only neatness ($p. < .01$), perseveration ($p. = .03$), and TMT-A ($p. = .05$) emerged as independent predictors. Positive correlations with the delay trial included TMT-A, TMT-B, configural placement, cluster placement, and detail presence and placement. The regression model was significant ($R = .87$, $r^2 = .80$, $p. < .01$) with independent predictions from TMT-A and cluster placement performances.

Conclusion: Performance on the RCFT copy and delay trials is associated with measures of attention and processing speed in people with SLE. These findings suggest that simple attentional focus and efficiency underlie cognitive deficits in people with SLE. Future research is needed in order to understand the contribution of higher order attentional mechanisms, such as engagement and initiation, in cognitive functioning within the SLE population.

Electrophysiological markers for executive control-emotion interactions:

Implications for depressive disorders. *Aliza Schwartzblatt¹, Kathryn Dana¹, Justin Storbeck, Ph.D.^{1,2}, Jennifer Stewart, Ph.D.^{1,2}, ¹The Graduate Center, CUNY.*

²Psychology Department, Queens College, CUNY. Although negative emotions are generally thought to be associated with poor cognitive outcomes (Eysenck et al., 2007), the literature has shown that negative emotions can be functional and improve performance (Storbeck, 2012). By observing individuals in negative and positive mood states, we aim to determine whether sadness compared to happiness promotes inhibitory function by examining behavioral and brain activity outcomes. By examining the relationship between frontal electroencephalography (EEG) asymmetry and patterns of brain activity during the inhibition task in depressed versus non-depressed individuals, we aim to understand how trait inhibition interacts with state inhibition to influence performance. Additionally, a promising Major Depressive Disorder (MDD) endophenotype is right frontal asymmetry, a pattern of brain activity thought to reflect heightened withdrawal motivation and experience of

negative emotional states. The standard assessment protocol has been to record EEG during a resting state although research has shown that asymmetry measured during emotion challenges is a more robust measure of emotion processing than asymmetry measured at rest (Coan, Allen, & McKnight, 2006). Using the capability model, we aim to see whether frontal EEG asymmetry correlates with depressive status (MDD+ versus MDD-) and trait versus state negative emotionality. After a clinical interview to confirm the absence of lifetime Axis 1 disorders, eligible participants will be induced into a positive or negative mood state via film clip, complete an inhibition Go/No-Go task and fill out various questionnaires while being recorded by a 128-channel EGI EEG cap. Through this study, we aim to identify a cost-efficient and effective biomarker screening procedure for identifying MDD risk and to further study the beneficial cognitions associated with negative mood states.

Baseline characteristics of a combination treatment trial for mild cognitive impairment with depression. *Jeff Motter¹, Davangere Devanand², P. Murali Doraiswamy³, Joel Sneed, Ph.D.^{1,3,4}, ¹The Graduate Center, CUNY; ²Columbia University and the New York State Psychiatric Institute, ³Duke University, ⁴Psychology Department, Queens College, CUNY.*

Background: Patients presenting with depression (DEP) and cognitive impairment (CI) represent a unique, understudied population that is difficult to diagnose, treat, and estimate prognosis. Because DEP in patients with CI increases the risk of conversion to dementia, treatment strategies for DEP-CI have longer-term implications beyond acute antidepressant response. In this study, we examined baseline characteristics of a combination treatment randomized controlled trial.

Method: All patients received open antidepressant treatment with citalopram for 8 weeks. At 8 weeks, responders were randomized to add-on donepezil or placebo. Non-responders received open treatment with venlafaxine and were randomized 8 weeks later (16 weeks of open treatment) to add-on donepezil or placebo. Patients were followed for 18 months with continuous open antidepressant treatment. Mood was assessed using the Hamilton Depression Rating Scale (HAMD), and cognition was evaluated with the Selective Reminding Task (SRT) and Alzheimer's Disease Assessment Scale (ADAS-Cog).

Results: 80 DEP-CI patients were recruited from the NYSPI/Columbia University Medical Center (N = 40) and Duke University Medical Center (N = 40). The mean age was 68.7 ± 9.0 and 48.1% of the sample was female. 50.6% reported a family history of depression, 45.7% of dementia, and 17.3% of Alzheimer's. Patients had a mean HAMD of 23.00 ± 5.1 , SRT of 41.9 ± 12.7 , and ADAS-Cog of 14.4 ± 5.5 .

Conclusion: This study provides an overview of the demographic and neuropsychological characteristics of patients with comorbid DEP-CI. Results obtained after 18 months will allow greater understanding of change in cognitive status and predictors of conversion to dementia.

Emotion processing as a predictor of child physical abuse perpetration. *Amanda Zwilling*¹ & *Valentina Nikulina, Ph. D.*^{1,2}, ¹*The Graduate Center,* ²*Psychology Department, Queens College, CUNY*. Childhood physical abuse is a pervasive social problem that impacts millions of children worldwide. Researchers have identified a range of caregiver risk factors for physical abuse perpetration, but emotion processing deficits remain underexplored. This talk will examine what is currently known about caregiver emotion cognition (i.e. emotion recognition, regulation, empathy, emotion contagion, mimicry) and the risk for child physical abuse perpetration. First, the extant research on putative predictors of child physical maltreatment will be introduced. Then the neurobiological and empirical research on caregiver emotion cognition deficits and physical abuse perpetration will be reviewed and a cohesive model of this relationship will be presented. Finally, gaps in the literature and unanswered research questions will be discussed.

SSRIs may not be the most “attractive” way to treat anxiety and depression: How antidepressants affect romantic attraction. *Carly Tocco*^{1,2}, *Claudia Brumbaugh, Ph.D.*^{1,2} ¹*Psychology Department, Queens College, CUNY;* ²*The Graduate Center, CUNY*. Selective Serotonin Reuptake Inhibitors (SSRIs), a class of antidepressants, help restore proper balance of serotonin in people suffering mental illness, but their usage may come at a cost socially. Anecdotal findings suggest individuals taking SSRIs often experience a loss of affection toward romantic partners and sexual dysfunction. The current study investigated whether SSRI use impacts relationship initiation and attraction. Participants were asked to rate their attraction to 30 photographs (and complete an attachment style measure. SSRI users reported higher levels of anxious attachment than the control group. While we expected to see lower attraction ratings in SSRI users, preliminary data does not yet show this trend. Taken together, the mental illness (i.e., anxiety or depression) that requires an SSRI may explain the higher anxious attachment we observed. While we initially predicted that SSRI users would exhibit lowered physical attraction toward others due to emotional blunting from the medication, it appears that individuals taking SSRIs may not need to fear having less physical attraction to others. Although SSRIs relate to sexual dysfunction in established relationships, they may not necessarily complicate the establishment of new

romantic relationships.

Impact of neurodevelopmental genes on the trajectory of ADHD severity, a pilot study. *Agnieszka E. Mlodnicka*¹, *Yoko Nomura, Ph.D.*^{1,2}, *Yasmin Hurd, Ph.D.*³, and *Jeffrey M. Halperin, Ph.D.*^{1,2}, ¹*The Graduate Center,* ²*Psychology Department, Queens College, CUNY,* ³*The Icahn School of Medicine at Mount Sinai, NY.*

Attention-deficit/Hyperactivity Disorder (ADHD) is a chronic neurodevelopmental disorder characterized by symptoms of inattention and hyperactivity and delays in neural development. To assess the impact of genes involved in neurodevelopment on symptoms of ADHD saliva was collected and genotyped from participants in a longitudinal study of preschoolers who were followed annually for 7 years. We examined the impact of four single nucleotide polymorphisms (SNPs) in genes associated with neurodevelopment: neuregulin-1 (SNP rs3924999), neurotrophin-3 (SNP rs6489630), brain-derived neurotrophic factor (rs6265), and regulator of G protein signaling 4 (rs951439). The sum of risk alleles from the four genes was determined for each participant (possible range 0-8) and correlated with ADHD severity as assessed by semi-structured interview completed with a parent.

Significant positive correlations were revealed between the number of risk alleles and ADHD severity at each time-point: Time 1 ($r = 0.286$, $p < 0.001$), Time 2 ($r = 0.262$, $p < 0.01$), Time 3 ($r = 0.262$, $p < 0.01$), Time 4 ($r = 0.299$, $p < 0.001$), Time 5 ($r = 0.302$, $p < 0.001$), Time 6 ($r = 0.288$, $p < 0.01$), Time 7 ($r = 0.331$, $p < 0.01$). Overall, the data indicate a positive linear relation between the number of risk alleles involved in neurodevelopment and ADHD severity, suggesting that a combination of genes contribute to ADHD severity rather than an individual gene. Although this an initial pass at understanding the data and the sample size is small for genetics study, these findings can inform additional investigations in understanding the neurodevelopment and heritability of ADHD.