MIND BRAIN RESEARCH DAY 2018

TUESDAY, MARCH 27, 2018  •  11:00 am - 3:00 pm

SAYLES HALL AND SALOMON HALL
BROWN UNIVERSITY CAMPUS

POSTER ABSTRACTS
GENERATING A CIRCUIT MAP OF COMMISSURAL NEURONS PROCESSING SOMATOSENSORY INPUT

Jane Abolafia, BA; Alastair Tulloch, MS; and Alexander Jaworski, PhD

Spinal commissural neurons receive input from peripheral sensory neurons and relay this information to various brain regions for further processing. However, the spinal cord circuitry which underlies somatosensory processing is not yet fully defined. Using novel genetic tools developed in mice and rabies viral tracing methods, we aim to produce a map of commissural neurons, their direct monosynaptic inputs, and the brain targets they innervate. This circuit map will relate the connectivity of commissural neurons to other properties such as position within the spinal cord, somatosensory modality processed, and molecular subtype. We will thus clarify the logic of somatosensory processing by commissural circuitry, an advance which will enable functional and mechanistic studies to further our understanding of this important system.
EXAMINING ADOLESCENT SUICIDALITY AND PARENT- AND ADOLESCENT-REPORTED YOUTH CHARACTERISTICS IN COURT-INVOLVED YOUTH

Katelyn Affleck, MA; Daniel Gittens Stone, MA; Christie Rizzo, PhD; Kathleen Kemp, PhD

Adolescents in the justice-system are at higher risk for engaging in suicide ideation and behaviors than youth in the general population. However, suicidality rates of justice-involved youth vary based on several factors, including point of juvenile justice contact and assessment method. Adolescent and parent reports of suicidality are lacking in this population. The current study examined suicide ideation and behaviors across parent and adolescent self-report and mental health characteristics associated with adolescent suicidality in a sample of court-involved youth. Parent and adolescent agreement on reported suicidality and mental health characteristics was notably discordant. Future directions and research implications are discussed.
TRANSCRANIAL MAGNETIC STIMULATION MODULATES FUNCTIONAL ARCHITECTURE IN POSTTRAUMATIC STRESS DISORDER

Emily Aiken, BS, MA, Jennifer Barredo, PhD, Mascha van’t Wout-Frank, PhD, Benjamin D. Greenberg, MD PhD, Linda L. Carpenter, MD, & Noah S. Philip, MD

Background: Posttraumatic stress disorder (PTSD) is consistently associated with ventromedial prefrontal cortex (VMPFC) dysregulation and other neural network disruptions. However, few studies have tested systems-level network organization in PTSD or how network-targeted treatments might change functional organization. Convergence is a voxel-level density metric describing the architecture of functional networks (Bell et al., 2015). Networks exhibiting higher convergence are biased toward integrative processing, whereas low convergence networks are more segregated. This approach has yet to be used in clinical populations, and is a promising method to describe network-based etiologies underlying functional connectivity changes observed in psychiatric illnesses. To this end, we 1) evaluated how convergence differed between posttraumatic stress disorder (PTSD) patients and controls, and then tested 2) how convergence changed in PTSD patients after repetitive transcranial magnetic stimulation (TMS).

Methods: Resting state functional connectivity (RSFC) MRI networks were defined in 84 participants (42 PTSD, 42 matched controls), using individual level cortical surface modeling and RSFC networks. Using neurosynth combined with prior literature, we created a region of interest (ROI) matrix of brain areas disrupted in PTSD. Convergence, the sum of networks represented within a voxel, was calculated within and between networks. Then, subject-level convergence statistics were entered into linear models to evaluate their impact on the ROI matrix. ROI and convergence analyses were repeated on a PTSD group subset (n=25) who received 5Hz TMS to the left dorsolateral prefrontal cortex (DLPFC) for up to 40 sessions.

Results: There was reduced amygdala-to-prefrontal RSFC in PTSD patients compared to controls (p<.05); greater convergence in the frontoparietal control network (FPN) predicted connectivity results (p<.05). Within DMN connectivity was also increased in PTSD patients, but this result was not influenced by convergence. Furthermore, across groups, DMN convergence influenced RSFC strength between the DMN and salience networks (SN), where greater DMN convergence was associated with reduced SN-to-DMN connectivity in controls. DMN convergence directly influenced coupling between the SN and DMN (p <.01), where greater DMN convergence was observed in healthy controls. TMS was associated with reduced hippocampus to SN connectivity, which was significantly predicted by increased DMN convergence (p<.005), which was significantly associated with PTSD symptom reduction (p<.005).

Discussion: We observed reduced prefrontal-to-limbic RSFC coupling in PTSD. These relationships were associated with increased information flowing through the FPN, consistent with insufficient top-down modulation. Furthermore, convergence measures indicated greater network segregation in healthy controls, and the opposite in PTSD patients. While TMS caused reduced hippocampal-to-SN connectivity, these results were attributable to shifts towards greater information flow through the DMN. These results demonstrate that network convergence can be used to characterize multi-network interactions and provide new ways to investigate mechanisms of action of brain stimulation.
IMPAIRED NEGATIVE EMOTIONAL RESPONSE INHIBITION IS ASSOCIATED WITH SUICIDAL IDEATION IN A HIGH-RISK COMMUNITY SAMPLE

Kenneth Allen, AM, Michael F. Armey, PhD, Heather T. Schatten, PhD, Jill M. Hooley, DPhil

Despite occurring in the absence of lethal intent, nonsuicidal self-injury (NSSI) remains one of the best predictors of future suicide attempts. Multiple theoretical models have been proposed to explain this relationship; however, more empirical work is needed to elucidate how NSSI might confer risk for suicidality. Previously, we demonstrated that NSSI involves specific impairment in negative emotional response inhibition (NERI): the ability to control prepotent impulses associated with negative affect. This study comprises a secondary analysis of data examining NERI in NSSI and healthy controls, to determine whether this cognitive process is related to frequency of suicidal ideation (SI) in a population at elevated risk for suicide. 46 community adults reporting current or past SI (34 with a history of NSSI) completed self-report measures of suicide-related constructs (e.g., depression), the Self-Injurious Thoughts and Behaviors Interview, and the Emotional Stop-Signal Task to measure NERI. Zero-inflated Poisson regression models indicated that poor NERI predicted SI frequency in the past year, controlling for depressive symptoms (in the sample as a whole) and past-year NSSI frequency (among participants with an NSSI history). Additionally, participants who reported engaging in NSSI prior to SI onset showed worse NERI than those whose SI preceded NSSI onset or began concurrently. Although preliminary, these results indicate a relationship between persistent suicidal thinking and compromised inhibitory control over negative emotional impulses. These findings further suggest that impaired NERI may be a marker of SI severity among self-injurers, a population already at heightened risk for suicide. Deficits in this cognitive process might therefore facilitate the transition from NSSI to suicidal self-injury through increasing SI frequency. This cross-sectional pilot study encourages longitudinal research to determine NERI’s role in the temporal dynamics between NSSI and suicidal thoughts and behaviors.
ASSESSING BELIEVABILITY AND KICK BACK WITHIN A SOCIAL NORMS CAMPAIGN TO REDUCE VIOLENCE IN RHODE ISLAND MIDDLE SCHOOLS

Abigail P. Ballou, Katherine W. Bogen, BA. Kaitlyn K. Bleiweiss, BS,
Lindsay M. Orchowski, PhD

Foundations for expectations of healthy, normative relationship behaviors are established during “early dating” (i.e. relationships that develop in early adolescence; Josephson & Proulx, 2008). Middle school students are therefore an ideal population to engage in violence prevention efforts. Social norms interventions – or interventions that focus on communicating healthy community norms and correcting misperceptions of violence acceptability – provide a promising new direction for efficacious intervention design (Fabiano et al, 2003; Bohner, Siebler, & Schmelcher, 2006; Gidycz, Orchowski, & Berkowitz, 2011). Additionally, tailored interventions – adapted for specific populations – have shown to be more effective than non-tailored interventions (Kreuter & Wray, 2003; Gans et al, 2009). It is therefore feasible that tailored social norms approaches applying flexible, adaptive technical assistance to middle schools may be particularly impactful in preventing sexual and dating violence and improving student health outcomes.

The present research examined the utility of short “intercept interviews” conducted with intervention recipients structured to assess believability and kick back surrounding a 12-week social norms poster campaign to reduce violence among middle school youth. Intercept interviews were conducted every two weeks over a 12-week intervention period at two Rhode Island middle schools. Findings from intercept interviews informed the creation of relevant educational programming (“technical assistance”) for each intervention site.

Students at two intervention sites were interviewed during lunch periods on a bi-weekly basis. Over 800 intercept interviews were conducted with students between these two sites. Students were presented with the same questions during each round of interviews. Quantitative responses were recorded on iPads and downloaded into SPSS. Qualitative feedback on the poster campaign was recorded by the interviewee on an iPad at the time of the interview.

Data revealed that 65% to 98% of students at each study site had seen each poster, 76% to 100% believed the poster data, and 3% to 55% had discussed the posters with a friend, family member, teacher, or other affiliations across the 12-week intervention. Additionally, qualitative intercept interview findings impacted the provision of technical assistance such that support to each school was predicated on participant suggestions, feedback, and anecdotes.

The majority of students at each site saw and believed each poster, with a strong plurality discussing the poster campaign as it progressed. Despite consistent intervention over 12 weeks, believability of poster data was contingent on data topic, demonstrating that students do not inherently trust normative data presented via posters. Technical assistance should be implemented to address student disbelief of poster messages. Fluctuation of belief during technical assistance further demonstrates the importance of tailored interventions in order to enhance social norms interventions and bolster message believability.

Social norms theory-based interventions have proven beneficial in preventing sexual assault and countering misperceptions of violence acceptability. This study provides further insight into the utility of intercept interviews to strengthen a social norms poster campaign, correct student misperceptions, communicate healthy community norms, and provide tailored interventions. Social norms campaigns should incorporate regular feedback in order to provide flexible, adaptive technical assistance. Interventions would benefit from intermittent data collection regarding visibility, believability, and dissemination of social norms data.
INTERACTIONS BETWEEN COGNITIVE CONTROL AND DECISION-MAKING NETWORKS: A POTENTIAL BIOMARKER OF HIGH-RISK SUICIDALITY

Jennifer Barredo, PhD Emily Aiken, MS, Linda L. Carpenter, MD, Benjamin D. Greenberg, MD PhD, Noah S. Philip, MD

Background: Cognitive control facilitates adaptive decision-making. Impulsive, impaired decision-making often accompanies suicidal thoughts and behaviors. However, the suicide and decision-making relationship is non-linear. Decision-making is less impulsive in those with history of well-planned attempts when compared to less organized attempters or controls. Here, we use structural and functional MRI to probe the relationship between cognitive control and suicide risk in individuals with posttraumatic stress disorder (PTSD).

Methods: Suicidality scores from the Inventory of Depressive Symptomatology-Self Report (IDSSR) and structural and resting-state functional 3T MRI scans were collected from participants with PTSD (N=33, female=12, age=50 11). Subjects' grey matter volume and functional connectivity statistics from regions recruited during cognitive control (pars triangularis, dorsolateral, frontopolar cortices) and decision-making (striatum, insula, orbitofrontal cortex) were entered into statistical models of suicidal severity. Results were false discovery rate corrected.

Results: Left triangularis grey matter volume was positively associated with suicidal severity (p<.005). Left triangularis to right insula functional connectivity was positively associated with suicidality (p<.05). Left triangularis to frontopolar functional connectivity was anti-correlated with suicidality (p<.05). Other symptom correlations were non-significant (p>.1).

Conclusions: Greater integrity of the cognitive control network may facilitate planning and execution of suicidal behavior in susceptible individuals. Triangularis is recruited during response selection or inhibition, whereas insula is engaged during emotional and interoceptive processes. Triangularis-insula interactions may permit the override emotionally-driven, decision-making that might interfere with construction of a well-planned attempt. These preliminary results suggest that aspects of the cognitive control system are promising potential neuroimaging biomarkers warranting further investigation.
UNDERSTANDING THE PATIENT EXPERIENCE OF PSYCHIATRIC NEUROSURGERY FOR INTRACTABLE OBSESSIVE COMPULSIVE DISORDER

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Background
A small subset of patients with Obsessive Compulsive Disorder (OCD) undergo neurosurgery for intractable illness. Despite this, little is known about the experiences of these individuals pre- and post-neurosurgery.

Methods
We conducted semi-structured interviews with 6 participants (4 responders, 2 non-responders) after Gamma Ventral Capsulotomy (GVC) for OCD. Patient interviews were analyzed for common language/narratives through Interpretive Phenomenological Analysis, a well-established method of qualitative analysis designed to capture patients’ lived experiences.

Results
All interviewees demonstrated significant concordance in narratives: 1) After years of conventional treatments, patients felt neurosurgery was their “last hope” and described themselves as “desperate.” 2) All exhibited code-switching between the medical/scientific and supernatural/religious lexicons, with some describing the surgery as “magical.” 3) Post-surgery, subjects described fear/worry as they waited for improvement, consistent with literature on Gamma Knife for other indications. 4) Patients that improved described it as losing an “enemy” in the brain and stated they had or were planning to discontinue psychiatric treatment, despite extensive cautions. 5) Patients that had not improved described themselves as “depressed” and “hopeless.”

Conclusions
This is the first study examining the lived-experience of patients undergoing GVC for OCD. Ethicists have noted that patients receiving psychiatric neurosurgery are a uniquely vulnerable population given desperation for surgery. These data suggest patients are desperate, perhaps out of fear that surgery is a last option. This perception may lead those who improve after surgery to discontinue standard treatment, despite clinical advice. More attention may need to be given to these two issues in pre- and post-operative management.
FEASIBILITY AND INITIAL RESULTS OF INSPIRATORY MUSCLE TRAINING ON COGNITION AND FUNCTIONAL CAPACITY IN OLDER VETERANS WITH HEART FAILURE

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Objective: To examine whether inspiratory muscle training (IMT) can enhance cognition and functional capacity in veterans with heart failure (HF). Inspiratory muscle weakness has been implicated as an underlying mechanism of exercise intolerance in HF and may be associated with HF-related cognitive impairment. IMT increases respiratory muscle strength through repeated inspiratory exercise with resistance, and has been associated with improved functional capacity in HF at levels comparable to those seen with structured exercise programs.

Participants & Methods: Participants are 9 older male veterans (mean age=77) with clinically stable HF and no known history of neurological conditions (e.g., stroke, TBI, dementia). They were randomized to active (n=6) or pseudo-sham (n=3) IMT. In active treatment, the IMT device is set to a resistance of 30% maximum inspiratory pressure (MIP; a measure of functional capacity); in pseudo-sham IMT, the device is set to 5% MIP or lowest setting. Participants completed up to 30 minutes of daily at-home breathing exercises for 6 weeks and attended weekly study visits to assess MIP and adjust the IMT device. Neuropsychological testing was completed at study baseline and end of study.

Results: The current small pilot sample size precludes formal statistical analyses, but a few trends have emerged. For example, the active-IMT group’s MIP improved by 27.93 (SD=13.58) compared to 2.60 (SD=19.34) for pseudo-sham from baseline to post-treatment. Cognition appears to be relatively stable within this limited sample. There were no unexpected study-related adverse events.

Conclusions: Initial findings indicate that a 6-week IMT intervention is a feasible and generally well-tolerated at-home intervention for older veterans with HF.
GENDER DIFFERENCES IN THE MANIFESTATION OF CYBERBULLYING PERPETRATION AMONG HIGH SCHOOL STUDENTS: SURVEY FINDINGS ACROSS RHODE ISLAND HIGH SCHOOLS

Kaitlyn Bleiweiss, BA, Katherine W. Bogen, Liza Cooney, Hannah Lavoie, Amanda Wozniak, Lindsay Orchowski, PhD

Bullying and teen victimization takes many forms during childhood and adolescence, including physical, verbal, relational/social, and online harassment (Centers for Disease Control, 2018). Moreover, technological advances have increasingly become an everyday part of the adolescent bullying experience (U.S. Department of Health and Human Services, 2018). Eighty-seven percent of American adolescents between the ages of 12-17 use the internet, with 51% of these users participating in the cyberspace on a daily basis, and 45% of teenagers routinely participating in cell phone communication (Lenhart, Madden, & Hitlin, 2005). Perpetration of cyberbullying or cyber sexual harassment consists of threatening, worrisome, emotionally hurtful, or sexual messages delivered in cyberspaces via any electronic medium (Bossler, Holt, & May, 2012). Electronic victimization is associated with negative psychological outcomes such as low self-esteem and self-efficacy, as well as heightened stress, anxiety, and depressive symptoms (Fredstorm, Adams, & Gilman, 2011). According to research on school-based violence and bullying, adolescent males are more likely to be both perpetrators and victims of bullying (Carbone-Lopez, Esbensen, & Brick, 2010), while adolescent females are more often subjected to requests of sexually explicit content (Li, 2005; 2006; 2007).

The present research examined gender differences in the perpetration of cyberbullying - specifically, whether gender was associated with cyberbullying involving sexual harassment or strictly aggressive/threatening comments. Cyber abuse measures (both sexual and non-sexual) were modified from Bennett (2011) and Ybarra (2007). Surveys were collected as part of a larger CDC-funded study evaluating a dating and sexual violence prevention program among high school students.

Tenth-grade students (N=2204) at 20 Rhode Island high schools completed an anonymous survey assessing their sexual attitudes and their experiences with bullying. One section of the survey asked students about their cyberbullying behavior (modified from Ybarra et al., 2007). This section consisted of 7 questions - 3 items assessing perpetration of sexual harassment in an online setting (pressuring to talk about sex, asking for or posting sexually explicit photos “nudes”, and pressuring to do sexual things), and 4 items measuring frequency of perpetration of stereotypical forms of online bullying (mean/hurtful comments, threatening comments, spreading rumors, and stalking).

Students who identified as male (N=1027) or female (N=1075) were included in the present analyses; other genders (i.e. non-binary or gender-fluid students) were excluded as they made up too small of a subsample (N =18). On average, boys and girls reported infrequent cyber sexual abuse (M=.18, SD=.76) with possible scores ranging from 0 to 9. Boys and girls reported slightly more frequent non-sexual cyber abuse (M=.60, SD=1.40). There was a significant difference between boys (M=.21, SD=.83) and girls (M=.11, SD=.42) cyber sexual abuse perpetration, t(1976)=3.42, p=.001. There was no significant difference in non-sexual cyber abuse perpetration between boys and girls. Correlation analyses showed that: (1) there was a significant relationship between cyber sexual abuse and non-sexual cyber abuse (r=.50, p<.001), (2) the relationship between cyber sexual abuse and non-sexual cyber abuse was stronger for boys (r=.62, p<.001) than girls (r=.30, p<.001).

Findings support the existing research that boys are more likely to perpetrate bullying, with boys among our sample more frequently participating in cyber sexual abuse. Additionally, non-sexual cyber abuse was more common among our sample, indicating that, thought online platforms provide a pathway for opportunistic sexual violence perpetrators, youth may nevertheless be more likely to experience other forms of online bullying or harassment.
TRAJECTORIES OF MATERNAL CIGARETTE USE DURING PREGNANCY AND ASSOCIATIONS WITH MARIJUANA CO-USE

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Background: Smoking patterns in adult non-pregnant populations tend to be relatively stable over time with high rates of marijuana co-use. In contrast, a small but growing literature has shown variability in smoking patterns among pregnant smokers. However, little is known about the covariation between smoking patterns and marijuana during pregnancy. Many past studies that examine perinatal smoking behavior compare pregnant women based on absolute smoking status (i.e., smoking vs. non-smoking), thus, studies are needed that can account for: 1) changes in tobacco use across pregnancy; and 2) the association between smoking patterns and marijuana co-use. The current study explored the utility of growth curve mixture modeling to identify smoking trajectories across pregnancy, as well as associations between perinatal smoking trajectories and marijuana co-use.

Methods: Participants were N=166 pregnant smokers from two cohorts oversampled for prenatal tobacco use, the Behavior and Mood in Babies and Mothers (BAM BAM; enrolled 2006-2010) and BAM BAM-2 (enrolled 2012-2015) studies. Maternal use of tobacco and marijuana were assessed from 3-months preconception through third trimester via repeated calendar-based interviews conducted during pregnancy. Maternal reports of substance use were biochemically verified using maternal and infant saliva (i.e. cotinine) and infant meconium. Pregnant mothers reported on demographic variables and maternal and infant medical charts were reviewed to obtain information on infant sex, birthweight, and gestational age at delivery.

Statistical analysis: Variability in patterns of smoking across pregnancy was modeled using latent growth mixture modeling (GMM) as applied in Mplus. GMM estimates latent classes of individuals with different trajectories of smoking. Average cigarettes smoked per week across four perinatal stages (3 months prior to pregnancy, 1st trimester, 2nd trimester, and 3rd trimester) were used as continuous indicators for estimating the latent growth trajectories. We tested both linear and quadratic curves. A variety of fit indices were used to select the final models (e.g., Bayes Information Criterion [BIC], the Bootstrapped Likelihood Ration Test [BLRT], entropy, and class proportions). The corrected 3-step analysis was used to examine the association between patterns of maternal smoking and marijuana co-use across pregnancy, as well as maternal demographics and infant outcomes. Prenatal marijuana use was quantified by mean number of joints smoked per week during pregnancy.

Results: A quadratic effect was the best fit for maternal smoking trajectories. A 3-class solution had the lowest BIC, and best fit (entropy=.90, BLRT p=.00), identifying three maternal smoking trajectories: “light smokers/low reducers,” “moderate smokers/moderate reducers,” and “heavy smokers/heavy reducers”. Although overall 3-group differences in prenatal marijuana use were not significant, we found that pregnant women in the light smokers/low reducers class trended toward greater marijuana use than those in the moderate smokers/moderate reducers, or heavy smokers/heavy reducers classes combined (t=1.7, p=.09, Mean=4 vs. 2 joints per week). We also found that the light smoker/low reducer group contained more racial/ethnic minorities than the other two groups.

Conclusion: We demonstrated that growth curve mixture modeling to examine patterns of smoking during pregnancy made a useful analytic tool and found suggestive associations with patterns of marijuana co-use. Although these results should be interpreted as preliminary due to the small sample size, results suggest that individuals who exhibit low levels of tobacco use during pregnancy may be at an increased risk for higher marijuana co-use.
Towards an fNIRS-Based Brain-Computer Interface for Communication

Seyyed Bahram Borgheai, PhD, M. Abtahi, K. Mankodiya, Y. Shahriari

Brain-computer interface (BCI)-based communication is still a challenge especially for patients lacking voluntary muscle control. Although most of the state-of-the-art BCI-based communication systems mainly rely on electroencephalography (EEG), recent studies have demonstrated the feasibility of using functional near-infrared spectroscopy (fNIRS) for BCI-based communication [Naseer et al., 2014]. Schudlo et al., (2014) developed a system where subjects were selecting one letter out of three using a mental arithmetic task. However, due to the latency in hemodynamic changes, all these systems are considerably slow. Besides, all these communication tools use binary classification which requires the subject to perform several commands to spell only one letter. To address these issues, inspired by oddball paradigm commonly used for EEG-based P300 speller, this study has investigated the feasibility of developing a novel oddball-based fNIRS speller. The inherent nature of the oddball paradigm which selects the target based on the intersection of rows and columns can compensate the intrinsically slow fNIRS response.

Data was recorded from five healthy subjects. fNIRS data was collected using NIRScout system and digitized at 7.8125 Hz. 12 fNIRS channels located on the prefrontal and frontal areas, mainly responsible for the arithmetic tasks, were used in this study [Chau et al., 2014]. Concurrent with fNIRS, EEG data was acquired using g.USBamp and digitized at 256 Hz. Eight electrodes proposed by Krusienski et al., (2008) were used for EEG recordings. A 6x6 matrix of letters was used where each row/column was randomly intensified only once (i.e., single trial) for 300 ms with 6 sec inter-stimulus-interval. The conventional speller matrix was further modified by replacing the "flash" condition with a 2x2 matrix of digits and the subjects were then asked to do a mental arithmetic task. All the stimulation presentations were controlled using BCI2000 software [Schalk et al., 2004]. Within four different window lengths (i.e., 1, 2, 3, and 4 sec), integral, maximum, one temporal sample, and the slopes of oxyhemoglobin (HbO) were used as fNIRS feature, and four temporal features of event-related potential were used as EEG features. Statistical parametric mapping (SPM) and correlation analysis were used to select two and three most optimum channels for fNIRS and EEG respectively. Through a bootstrapping procedure with 10 repetitions, 70% of the data was used for training, the rest for the test, while linear discriminant analysis (LDA) was employed for further evaluation.

Using fNIRS only within 2 sec window length, we could achieve an average accuracy, sensitivity, and specificity of 74.9±4.9%, 63.5±13.7%, and 77.3±3.9% respectively. By merging the fNIRS and EEG features together, in our hybrid modality, these values improved to 78.8±5.1%, 70.0±11.9%, and 80.8±4.7% respectively. One of the objectives of this study was to develop a novel fNIRS-BCI-based communication modality which can be further applied to patients with various types of neuromuscular disorders. Achieving a satisfactory performance of 74.9% using only 2 frontal channels highlights the superior convenience of fNIRS which can facilitate the use of BCI devices in patients whose heads need to rest on their wheelchairs. One explanation for reaching such performance within a short time can be attributed to an initial dip following a mental load task, supporting previous findings reported by Zafar et al., (2016). However, further investigations are needed to evaluate the character recognition and information transfer rate. Developing a fNIRS-based communication tool can provide a new avenue for the BCI research for patients who can not use the EEG-based BCIs conveniently and reliably. Besides, the complementing nature of two types of brain responses, electrical and underlying hemodynamic activities, can be further utilized in better understanding the pathological brain.
Transcranial alternating current stimulation (tACS), a non-invasive neuromodulation technique, has exhibited its therapeutic utility in a variety of applications. While the benefits of tACS are evident, its neuromodulation mechanism is still not fully understood; making it difficult to select appropriate therapeutic stimulation parameters. We had designed and built a novel Encephalography (EEG) – tACS technique to provide data for complementary biophysically realistic neural modeling. In this feasibility study, we aimed at testing the effect of tACS technology on the modulation of brain wave oscillations that gate salience of tactile sensation.

Studies have shown that frequency specific stimulation can change the excitability of sensory cortices in humans (Kanai 2010; Zaghi 2010; Feurra 2011). Moreover, prior work in the Jones Lab has shown that cued attention can modulate neocortical alpha oscillations in primary somatosensory cortex (SI), and that pre-stimulus alpha power in SI predicts tactile detection (Jones 2010). Furthermore, tACS can increase endogenous cortical oscillations in specific frequency bands (Pogosyan 2009) including, most relevant to this proposal, the alpha band (Zaehle 2010). Based on these reports, we hypothesize that tACS can alter the allocation of endogenous alpha oscillations in S1 and by that affect tactile detection thresholds.

This study utilized concurrent EEG and tACS over SI while participants took part in a tactile detection task. There was a statistically significant decrease in performance (tactile detection rate) before and after tACS (applied at individual’s endogenous alpha). Effect was maintained after tACS stimulation (p <0.05). Changes in detection thresholds were not statistically significant when applying sham tACS stimulation. In parallel to these findings and to prior reports, power spectral density of the alpha band activity was significantly higher on trials where tactile stimuli were missed versus detected. These preliminary results support the hypothesis that perturbing brain dynamics – specifically within the alpha frequency band – is feasible with tACS, and is associated with perceptual performance. Further studies are needed to test whether these effects are secondary to tACS entraining alpha activity specifically. This study presents an opportunity to increase our understanding of cortical sensory mechanisms and potentially develop new promising methods for treating different neurological disorder with somatic symptoms related to external stimuli detection.
POTENTIAL FOR NEUROMODULATION USING PULSATILE LOW-INTENSITY FOCUSED ULTRASOUND

Paul Bowary, MD, Benjamin Greenberg, MD, PhD

While transcranial magnetic stimulation (TMS), transcranial current stimulation (TCS) and deep brain stimulation (DBS) are being broadly used for neurological and psychiatric illnesses, the emergence of a technology that combines each of their advantages and eliminates their drawbacks would definitely constitute a major turning point in the history of neurostimulation.

Focused ultrasound (FUS) has been of research and potential clinical interest as a neuromodulation method for over half a century. However, it is only over the past decade that interest in this technique has increased dramatically. High-intensity focused ultrasound (HIFU) is an approved technique for ablation of specific brain targets in the treatment of essential tremor (ET) and chronic pain. Low intensity focused ultrasound (LIFU) is unique among transcranial brain stimulation methods in combining exceptional spatial resolution (on the millimeter scale) with the potential to target sub-cortical structures (deeper than 10 cm) through the intact skull.

Researchers have been gaining interest in LIFU known for inducing reversible biological effects, no tissue damage and potential bimodal neuromodulation (excitation and suppression effects). Dozens of recent studies have been demonstrating the neuromodulatory effects of LIFUP (LIFU delivered in pulsatile fashion) in behavioral outcomes, electrophysiological recordings (EEG) and functional magnetic resonance imaging (fMRI). Thus, LIFUP currently presents itself as a potential alternative modality for non-invasive neuromodulation techniques.

We investigated the role of LIFUP in neuromodulation in animal as well as human research literature and explored the safety concerns delaying potential application of LIFUP in clinical human brain stimulation. We finally suggest minimum *FDA-determined acoustic limits that can serve as safety parameters for non-invasive human brain stimulation using LIFUP.

* FDA: Food and Drug Administration
THE RHODE ISLAND CONSORTIUM FOR AUTISM RESEARCH AND TREATMENT: OVERVIEW OF THE FIRST 1500 PARTICIPANTS

Rebecca Bradley, BS; Monica Trevino, BA; Kayla Perkins, BA; Thomas Anders, MD; Giulia Righi, PhD; Stephen J. Sheinkopf, PhD

The Rhode Island Consortium for Autism Research and Treatment (RI-CART) was established in 2009 with a goal to improve treatments and outcomes for Rhode Islanders with Autism Spectrum Disorder (ASD) through innovative research and collaborative efforts with community partners. Participants have been recruited through a variety of outreach efforts involving community partnerships, inpatient and outpatient clinician referrals, sponsorship and attendance of events, and online advertising. Participants and/or their caregivers provide information on family demographics, individual and family medical history, prenatal and developmental history, and history of services used. Measures of ASD symptom severity, cognitive and language abilities, and adaptive behaviors of each participant are assessed via caregiver report and standardized clinical tools. Here we provide an overview of our first 1,500 participants and present preliminary analyses in relation to diagnostic categorization, demographic data, comorbid medical and psychiatric conditions, recruitment, and availability of services. Finally, we report ongoing use of geographic spatial mapping analyses (GIS) to explore enrollment and case ascertainment in underrepresented communities. The RI-CART patient registry is a unique resource that adds the infrastructure for research on autism and developmental disabilities in Rhode Island.
The present study aims at understanding the developmental trajectory of neural circuitry of fear-associated learning and anxiety behavior development during adolescence. Our findings in mice suggest that anxiety may be reduced during early adolescence when compared to pre-adolescence and late-adolescence. This decrease in anxiety may explain previously published work detailing a deficit in the ability to express a conditioned contextual fear memory during early-adolescence. Here, we expand on our work by assessing the developmental trajectory of structures that project to the Basolateral Amygdala, a key structure in both the anxiety and fear circuits. Through this work, we assess the link between circuit development and behavioral phenotypes.
GENDER DIFFERENCES IN AUTISM SPECTRUM DISORDER: CHARACTERIZATION WITHIN A STATE-WIDE COMMUNITY-BASED SAMPLE

Elaine Bucknam, BA, Carolyn McCormick, PhD, Giulia Righi, PhD, & Stephen Sheinkopf, PhD

Background: Since first described by Kanner, autism spectrum disorder (ASD) has been conceptualized as a predominately male condition. However, the relationship between ASD and gender is more nuanced than previously assumed. Males are more likely to receive an ASD diagnosis than females with equal symptomatology, and females are diagnosed later in life than males (Mandy et al., 2011). This female under-identification may result from gender-specific behavioral profiles in ASD, and a lack of understanding of the female behavioral profile (Dworzynski et al., 2012).

Objectives: To evaluate potential differences in behavioral characteristics and diagnostic outcomes across genders in a community-based sample.

Methods: This study analyzed data from males (n = 1128) and females (n = 335) ages 2-69 years enrolled in the Rhode Island Consortium of Autism Research and Treatment (RI-CART), a state-wide community-based sample. Enrollees had or suspected an ASD diagnosis, came from varied racial and socioeconomic backgrounds, and lived in New England. Phenotypic assessment included measures of ASD symptoms (the Autism Diagnostic Observation Schedule; ADOS-2 and Social Responsiveness Scale; SRS-2), adaptive skills (Vineland Scales of Adaptive Behavior; VABS-II), and IQ (Kaufman Brief Intelligence Test; KBIT-2).

Results: Female RI-CART enrollees had significantly higher KBIT-2 scores F(1, 274) = 4.552 p = .034, η² = .016, VABS-II overall scores F(1, 1020) = 6.297, p = .012, η² = .006 and social skills subdomain scores F(1, 1028) = 8.003, p = .005, η² = .008. VABS-II Daily Living Skills domain scores and SRS-2 overall scores did not significantly differ by gender. Males had higher ADOS comparison scores than females F(1, 1204) = 6.059, p = .014, η² = .005. RI-CART enrollees of both genders with a community diagnosis of ASD had higher ADOS comparison scores than enrollees without a community diagnosis F(1, 1024) = 196.97 p < .001, η² = .005. However, of participants with a community diagnosis, females had a significantly higher age of diagnosis F(1, 560) = 7.47, p = .006, η² = .013. The interaction between community diagnosis and gender was significant. Male enrollees (vs. females) without a community diagnosis had significantly higher ADOS comparison scores F(1, 1204) = 5.479 p = .019, η² = .019. In contrast, ADOS comparison scores in male and female enrollees with a community diagnosis did not significantly differ.

Conclusion: Females had significantly higher age of diagnosis than male enrollees, as well as higher KBIT-2, VABS-II social skills subdomain, and overall scores. These findings suggest that females with ASD have behavioral presentations that contribute to the significantly lower ADOS-2 comparison scores in females when diagnoses have not been previously confirmed. Relatively better verbal, social, and adaptive skills may delay the age at which caregivers become concerned about social and developmental problems and in turn may contribute to later age of diagnosis. While these results are suggestive of a female profile, the patterns seen in this study are not fully consistent with some prior studies; this may be due to heterogeneity of the RI-CART sample (Fraizer et al., 2014). Future research should clarify the characteristics of the female behavioral profile and the impact on diagnostic practice.
PHYSICAL PAIN AS AN AVERSIVE STIMULUS: NEGATIVE REINFORCEMENT OF ALCOHOL AND OPIOID USE IN DAILY LIFE IN CHRONIC PAIN PATIENTS

Ryan Carpenter, MA, Timothy J. Trull, PhD

Negative reinforcement models of addiction have generally focused on negative affect. However, negative reinforcement can refer to the removal of any aversive stimulus. Physical pain is one particularly unpleasant stimulus commonly experienced in the general population. Many individuals with chronic pain use alcohol for pain management. Alcohol has analgesic effects similar to those of opioids, both of which stimulate the endogenous opioid system. Opioids, though increasingly controversial, remain frequently prescribed for chronic pain. However, while the analgesic properties of alcohol and opioids have been established in the laboratory, no research has examined their relationship with pain in the natural environment. It is, thus, unknown whether individuals choose to use these substances in moments of pain, and whether they experience meaningful pain relief following use. This is significant, because such a negatively reinforcing pattern of use may put individuals at heightened risk for developing a use disorder. The present study used ecological momentary assessment to examine negative reinforcement of alcohol and opioid use via pain in a sample of chronic back pain patients. Participants either drank alcohol at least twice weekly (n = 27) or regularly took prescribed opioids (n = 27), and reported on their pain and substance use multiple times daily for two weeks (n observations = 4,954). Multi-level modeling was used to test associations. Findings were inconsistent for alcohol. Pain largely did not predict consequent alcohol use, but use was associated with pain reductions. In particular, faster rate of consumption was associated with greater pain reductions (b = -0.12, p = .006). In contrast, findings strongly supported negative reinforcement of opioid use, with participants more likely to take opioids, and at stronger doses, at moments of elevated pain. Opioid use was also associated with next-moment pain reductions (b = -0.01, p < .001). Thus, while both alcohol and opioid use were associated with analgesia, evidence was stronger for the negative reinforcement of opioid use. However, given alcohol’s analgesic effects, pain-related consumption may increase as access to prescription opioids becomes more regulated. Chronic pain patients who use alcohol and/or opioids in response to pain may be at risk for addiction, and negative reinforcement models should be broadened to incorporate physical pain.
The current study investigated the effect of three different variations of 8-week mindfulness-based interventions (MBI) on objective indicators of emotion regulation. Three types of MBIs were investigated: Mindfulness-Based Cognitive Therapy (MBCT), Focused Attention (FA), which involves paying attention to a specific object (e.g. breath), and Open Monitoring (OM) practice, which emphasizes a choiceless and non-judgmental awareness of whatever arises in consciousness. 104 participants with mild-severe depression, anxiety and stress were randomized into one of the three treatment arms. Before and after the treatment, participants viewed pictures of negative, neutral, and positive valence, while activity of corrugator supercilii, an indicator of negative affect, was measured via surface electromyography (sEMG). Emotional reactivity was assessed during the first four seconds of stimulus presentation. A prompt then instructed participants to engage in an emotion regulation task corresponding to either FA (focus on breath) or OM practice (label emotions) for ten seconds. EMG-based emotional reactivity to negative pictures was attenuated after treatment, across all arms. Treatment type did not have a significant effect on reactivity. In the emotion regulation part of the task, corrugator activity was lower during "breath" compared to "label" both pre and post treatment indicating a reduction in negative emotional response when focusing on breath. There was no change in corrugator activity from pre to post treatment within the breath instruction, but corrugator activity within the label instruction was significantly higher before the treatment compared to afterwards. Results have implications on understanding the mechanisms by which MBIs affect emotional regulatory processes.
Mind-wandering is a cognitive process in which people spontaneously have thoughts that are unrelated to their current activities. The types of spontaneous mind-wandering thoughts that people have during a negative mood are similar to thoughts associated with depression. Mind-wandering, in general, has also been associated with negative outcomes such as higher ratings of unhappiness and cellular markers of aging and stress. Transcranial direct current stimulation (tDCS) is a form of noninvasive brain stimulation that has been used to change cognitive processes such as memory, learning, and attentional processes. We investigated whether tDCS of a default mode network (DMN) brain region associated with mind-wandering behavior can change maladaptive mind-wandering frequency and content following an affective challenge. tDCS of a DMN brain region did not change mind-wandering frequency after hearing criticism, but it did change what people mind-wandered about. Specifically, cathodal stimulation of the posterior inferior parietal lobule (pIPL) decreased the frequency of negative mind-wandering thoughts about the past. Individuals receiving sham stimulation and anodal stimulation did not have a significant change in their mind-wandering thought content. If tDCS of the pIPL can be used to change maladaptive mind-wandering thoughts, future studies could investigate tDCS of DMN regions as an intervention for clinically depressed individuals who suffer from negative, past-oriented cognitions.
THE RELATIONSHIP BETWEEN IRRITABILITY AND COGNITIVE FLEXIBILITY IN YOUTHS

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BACKGROUND: Irritability has been recognized as the most common reason children are brought for psychiatric evaluations. Affective neuroscience defines irritability as the symptom resulting from blocked goal attainment. Therefore, irritable behavior in children may result from impairments in cognitive flexibility, or the ability to adapt one’s thinking to changing rewards and punishments. Previous research suggests that categorically-defined groups of children with irritability differ in cognitive flexibility. These results emphasize that a better understanding of the different subsets of irritability and the cognitive impairments specific to each is essential for improving diagnosis and treatment of youth suffering from irritability. We now present preliminary analyses comparing cognitive flexibility in a trans-diagnostic sample of children with ranging severities of irritability.

METHOD: This study was IRB-approved at Bradley Hospital and Brown University. A total of n=39 children ages 8-12 years were enrolled. The severity of each participant’s irritability over the last six months was measured through parent- and self-report forms of the Affective Reactivity Index (ARI), a scale that contains six symptom items and one impairment item (‘Overall, irritability causes my child problems’) rated on three levels (‘not true’, ‘somewhat true’, ‘certainly true’). Participants were divided into three groups based on the impairment item score of the parent ARI: (1) low impairment (n=13); (2) medium impairment (n=7); (3) high impairment (n=19). To assess impairment in cognitive flexibility, participants completed the Intra-Extra Dimensional Set Shift (IED) task of the Cambridge Neuropsychological Test Automated Battery (CANTAB).

RESULTS: A one-way ANCOVA was conducted to determine group differences in IED performance while controlling for full-scale IQ. We found three main effects of group: (1) total errors [F(2,36)=3.79, p=.03]; (2) extra-dimensional shift errors [F(2,36)=3.88, p=.03]; (3) reversal learning errors [F(2,36)=4.23, p=.02]. Post-hoc pairwise comparisons revealed that all main effects were driven by significantly poorer performance in the high impairment group compared to the low impairment group. That is, children in the high impairment group had significantly more total errors (p=.04), including extra-dimensional shift errors (p=.03) and reversal learning errors (p=.04), than children in the low impairment group.

CONCLUSIONS: Our analyses suggest that children in the high impairment group had a larger deficit in cognitive flexibility compared to children in the low and medium impairment group. Children with high impairing irritability made significantly more errors on the IED task, consequently experiencing more blocked goal attainment, than children with less impairing irritability. These results may mimic a cycle of blocked goal attainment and irritable behavior in children who struggle to adapt to changes in their daily environment. Further work to enroll and study the complete sample (161 additional participants) is necessary to fully interpret this data. These preliminary results highlight the need for novel brain-based classification of irritability in children, as well as a greater understanding of neural and behavioral deficits specific to each class. Further elucidating this relationship between irritability and cognitive functioning is vital to advancing treatment options that target impairments specific to each class of irritability.
INVESTIGATING ETHANOL AS A MODULATOR OF NOTCH ENDOCYTOSIS

Ryan Cohen, Edward Anderson, PhD; Karla Kaun, PhD

Alcohol affects the brain’s reward pathways, resulting in cravings that fuel addiction. The Notch signaling pathway, involved in drug reward memory, is believed to be upregulated upon exposure to alcohol. This signaling pathway involves the dual cleavage of the intermembrane receptor Notch. The Notch intracellular domain translocates to the nucleus and interacts with transcription factors to impact gene expression. Endocytosis plays a role in Notch signaling and trafficking within cells. Rab proteins, GTPases that regulate endocytic trafficking, support the study of endocytosis by serving as markers of different endosomal elements. Specifically, colocalization of Rab5 or Rab7 with Notch can indicate Notch’s entry into early endosomes or late endosomes, respectively. We aim to study the effect of ethanol on Notch endocytosis that may underlie signaling increases in ethanol-exposed Drosophila melanogaster. Drosophila expressing GFP-tagged intracellular Notch (NiGFP) were exposed to either air or vaporized ethanol treatments. Brains were stained using immunohistochemistry for NiGFP, Rab7, and Rab5 and imaged. Colocalization of Rab5 and NiGFP signals and Rab7 and NiGFP signals were quantified in each brain, and image histograms were created to evaluate NiGFP, Rab7, and Rab5 pixel intensities in ethanol- and air-exposed brains. More than a two-fold increase in colocalization of Rab5 and NiGFP was found in ethanol-exposed brains compared to air-exposed brains, suggesting an increase in Notch’s entry into early endosomes. An increase in colocalization of Rab7 and NiGFP also occurred in ethanol-exposed brains compared to air-exposed brains, suggesting an increase in Notch’s entry into late endosomes for future trafficking to lysosomes. Image histograms showed greater frequency of high intensity NiGFP pixels in ethanol-exposed brains, similar distributions of Rab7 pixel intensity in ethanol- and air-exposed brains, and substantially greater frequency of low intensity Rab5 pixels in air-exposed brains. This greater frequency of low intensity Rab5 pixels raises concerns about the biological significance of the observed effect. Nonetheless, these results provide enough motivation to move investigation of ethanol’s effect on Notch endocytosis into cell culture.
Adolescent dating violence (ADV) is a pervasive public health issue that leads to numerous deleterious consequences for youth as well as significant costs to society. Indeed, approximately 9% of adolescents report being involved in physical ADV in the past year (CDC, 2011). Date SMART (Skills for Managing Aggression in Relationships for Teens; Blinded Citation 1) is a group-based intervention that utilizes principles of cognitive behavioral therapy (CBT) to target theoretically-driven mechanisms, most notably depressive symptoms, in the prevention of ADV and sexual risk behaviors. The Date SMART intervention targets depressive symptoms as a primary mechanism of change because depression has been repeatedly linked to both ADV perpetration and victimization (Brooks-Russell, Foshee, & Ennett, 2013; Capaldi, Knoble, Shortt, & Kim, 2012). Less is understood about how girls with higher depressive symptoms may respond differently to ADV intervention efforts. It is expected that some youth may benefit differentially from a preventive intervention, in part, based on the risk factors that they possess, such as depressive symptoms (Capaldi et al., 2012). Indeed, a lack of intervention effects for ADV behaviors themselves may be related to heterogeneity in response to interventions. Thus, it is essential to better understand the impact depressive symptoms have on intervention efforts.

A diverse sample of N = 109 female adolescents with a history of physical dating violence participated in a randomized controlled trial of the DateSMART program and a Knowledge Only comparison. Participants completed measures of both depressive symptoms (BDI-II) and dating violence perpetration (CADRI). Using baseline depression level as a primary risk factor, a series of multilevel models revealed significant main effects of baseline depression such that higher baseline depression was associated with greater physical dating violence perpetration and victimization. Results also showed a three-way interaction for assessment point, depressive symptoms, and condition for physical dating violence perpetration. Specifically, those with higher baseline depression in DateSMART showed significantly less physical dating violence perpetration at follow-ups compared to those with higher baseline depression in the Knowledge Only group. This difference in violence reduction between conditions was not observed for those with lower baseline depression.

Consistent with hypotheses, we found that girls with higher initial depressive symptoms only showed significant reductions in physical violence perpetration in the Date SMART condition. Notably, they did not show any improvements in physical violence perpetration in the KO condition. Thus, as expected, these findings indicate that Date SMART is especially fruitful among those girls who are at increased risk. In sum, the current study underscores that as we strive to make ADV intervention efforts efficient and effective, we may benefit from moving away from a uniform approach to implementation. Instead, our intervention efforts should mirror the dynamic nature of risk itself by flexibly targeting those most vulnerable.
PRENATAL TOBACCO AND MARIJUANA CO-USE: IMPACT ON NEWBORN NEUROBEHAVIOR AND STRESS RESPONSE

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Tobacco and marijuana are some of the most common prenatal substance exposures in the US and worldwide. The social acceptability and political landscape of marijuana as well as its potency has changed dramatically in the last two decades leading to increased use by pregnant women. The impact of prenatal exposure to tobacco (TOB) and marijuana (MJ) is typically studied in isolation. We investigated the influence of co-exposure to tobacco and marijuana on infant neurobehavior over the first postnatal month. Participants were 111 mother-infant pairs from a low-income, diverse sample (Mean age=25±5; 50% minorities). Tobacco and marijuana use were assessed by timeline followback interview with biochemical confirmation. Three groups were identified: (a) prenatal MJ+TOB, (b) prenatal TOB only, (c) controls. Newborn neurobehavior was assessed at seven time points over the first postnatal month using the NICU Network Neurobehavioral Scale (NNNS). MJ+TOB-exposed infants showed decreased ability to self-soothe (NNNS Self-regulation) and attend to stimuli (NNNS Attention), and increased need for examiner soothing (NNNS Handling) and sleepiness (NNNS Lethargy) versus unexposed infants. In addition, despite low levels of marijuana use in the MJ+TOB co-users (average 24 days of marijuana use across pregnancy), MJ+TOB co-exposure was associated with nearly double the impact on infant self-soothing and need for examiner soothing versus TOB-exposure alone. These results highlight synergistic effects of dual exposure to marijuana and tobacco vs effects of tobacco exposure alone, even in a sample with very low levels of marijuana use. Further research is necessary to understand the effects of marijuana and tobacco co-use during pregnancy on long-term infant outcomes.
RACIAL MICROAGGRESSIONS AND THE EMOTION REGULATION PROCESS: COGNITIVE, EMOTIONAL, AND BEHAVIORAL RESPONSES TO SUBTLE DISCRIMINATION

Kristin Davidoff, PhD, Tanya Erazo, MA, Neil Allicock, MA, Christine Serpe, MA, Heather Han, & Kevin Nadal, PhD

The current study seeks to further existing knowledge about the relationship between racial microaggressions and physical and mental health as a function of the emotion regulation process. Significant racial disparities in health status persist in the United States (U.S. Department of Health and Human Services, 2013). Previous research asserts that racial discrimination negatively impacts physical health (Williams, Neighbors, & Jackson, 2003), and studies of subtle discrimination support an inverse relationship with mental health (Borrell et al., 2006). The immediate process following the commission of a microaggression and the target’s internal response may have significant consequences for physical and mental health. The purpose of the current study is to examine the initial internal process of experiencing a microaggression immediately following its commission.

Participants (college students of color; N = 207) were presented with four ambiguous scenarios that contained racial microaggressions, the order of which was randomized for each participant. They were asked to respond to these scenarios by imagining what they would feel, think, and do in response to the vignettes. Participants were also given a demographics questionnaire and the Racial and Ethnic Microaggressions Scale (REMS; Nadal, 2011), a quantitative measure that examines the frequency of microaggressions experienced by the individual. The exploration of initial reactions and the process of experiencing a racial microaggression were addressed using a direct content analysis approach (Hsieh & Shannon, 2005), categorizing participants’ responses into three domains: emotional, cognitive, and behavioral reactions. Within these domains, a team of five researchers independently categorized responses into themes and convened to discuss the themes to consensus. An independent auditor reviewed the themes and provided feedback. Researchers then reviewed all responses and applied appropriate codes; two coders rated 20% of the sample of response to establish interrater reliability (Cohen’s $\kappa$ ranged from .41 to .97 across themes). Within the cognitive domain, participants reported themes of confusion, identifying the microaggression, externalizing the microaggression (assuming innocuous intent/assuming malicious intent), and normalization of the microaggression. In the emotional domain, participants reported a range of responses, including angry, annoyed/irritated, happy/proud, offended, sad, general distress, and neutral/no reaction. Behaviorally, participants responses included themes of passive responses, seeking clarification, disengaging from the situation or person, extending politeness/courtesy, increasing social engagement, and confrontation, which had a subtheme of directly addressing the microaggression. Out of the 189 participants who provided responses to the vignettes, 63.5% were determined to have recognized at least one microaggression across the four vignettes. A one-way ANOVA revealed significant differences across race, $F(4,182) = 5.12, p = .001$, with post-hoc Bonferroni analysis indicating that participants who identified as Black/African American, or Multiracial recognizing significantly more microaggressions than those who identified as White ($p = .025$ and $p = .002$, respectively). Results indicated that certain cognitive, emotional, and behavioral responses were correlated with previous experience with microaggressions (e.g., anger, normalization, and disengagement were positively correlated with reporting higher rates of prior experience with microaggressions). Implications for microaggression theory, education, intergroup relations, and clinical work will be discussed.
ALTERATIONS IN CONNECTIVITY DURING USE OF A P300-BASED BCI BY INDIVIDUALS WITH AMYOTROPHIC LATERAL SCLEROSIS

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Introduction: People suffering from Amyotrophic Lateral Sclerosis (ALS) can use a P300-based brain-computer interface (BCI) as a communication tool. Although BCI performance remains stable over time for healthy subjects [Krusienski et al., 2008], patient users can experience significant day-to-day variability on copy-spelling accuracies not explained by device malfunction or signal-to-noise ratio [Nijboer et al., 2010; Ahn et al., 2015]. Considering the possibility of non-motor dysfunction in addition to motor impairment in these patients, one possible explanation for such BCI performance fluctuations can be associated with physiological and cognitive variations [Phukan et al., 2011; Ahn et al., 2015, Nijboer et al., 2010]. While prior studies attempted to characterize the between-patients’ variability, this study takes the first steps to understand the within-patient changes in brain activity associated with BCI performance. To do so, this study seeks to characterize what the user contributes to this day-to-day variability by comparing non-causal connectivity in the electroencephalograph (EEG) across different brain regions during successful (≥70%) and unsuccessful (<70%) copy-spelling tasks.

Materials and Methods: Data were recorded from nine ALS patients over a period of 2-18 months. BCI Users donned an elastic cap with sensors at locations Fz, Cz, P3, Pz, P3, PO7, PO8, and Oz, and carried out a ten-character copy-spelling task. EEG data were amplified using g.USBamp and digitized at 256 Hz. Electrode impedances were kept below 40 kΩ across all runs. Using a 70% threshold for each run’s online performance, the runs were divided into successful and unsuccessful [Kübler et al., 2012]. We further explored the non-causal oscillatory relationships using Thomson’s multi-taper method in 1 second consecutive time windows with no overlap for frequencies of 1 to 30 Hz with ±1 Hz frequency bandwidth (3 tapers) [Thomson et al., 1982]. Magnitude squared coherency was computed for each of the runs. For each subject, across the runs, average coherence was obtained in the delta, theta, alpha, and beta bands between each pair of channels. Non-parametric Wilcoxon signed rank test was used to test the statistically significant connectivity alterations across different brain regions and two different types of runs.

Results: A significant increase of theta coherence between frontal (Fz)-central (Cz), and frontal-parietal (Pz) was observed in unsuccessful runs (p<0.05). Moreover, we observed a significant increase of delta coherence between frontal (Fz)-parietal (Pz, P3, PO7, PO8), and frontal (Fz)-occipital (Oz) channels.

Discussion: As previously reported, an increase of theta connectivity correlated with inferior communication performance can be a determining factor for vigilance and attention, and thus, negatively affect BCI performance [Mak et al., 2012; Chaudhary et al., 2017]. In support of prior studies, the present results indicate a significant increase of theta-coherence over frontal-parietal and frontal-central regions in unsuccessful runs. Cooper et al., 2015 found similarly increased theta connectivity and attributed it to error and goal conflict [Cooper et al., 2015]. The Wadsworth BCI home system gives feedback to users without regard for success, and thus, the users are very aware of their incorrect selection. The other possibility is cognitive deficit which supports the previous finding reported by Vecchio et al. (2014). Based on these findings, we speculate that frontal-central and frontal-parietal theta and delta-coherence increase may be one of the indicators of unsuccessful runs for ALS patients.
Personalized normative feedback (PNF) has shown promise as a stand-alone intervention for reducing alcohol use among college students. PNF uses norms clarification to correct drinking norms misperceptions by highlighting discrepancies between personal alcohol use, perceived peer alcohol use, and actual peer alcohol use. Previous reviews of personalized feedback interventions have identified norms clarification as key a component, prompting researchers to study PNF as a single-component intervention for college drinking. As the number of publications focused on PNF effectiveness has increased in recent years, an empirical review of these studies is warranted to assess the potential impact of PNF as a stand-alone program.

The purpose of the present study was to summarize available research and to perform a meta-analytic review of personalized normative feedback as a stand-alone intervention for college student drinking. Studies were included if they examined a stand-alone PNF drinking intervention, used a college student sample, reported alcohol use outcomes, and used a pre-post experimental design with follow-up at least 28 days post-intervention. Eight studies (13 interventions) completed between 2004 and 2014 met criteria for inclusion, with a total of 2,050 participants.

Effect size estimates (ESs) were calculated as the standardized mean difference in change scores between the treatment and control groups divided by the pooled standard deviation (Cohen’s d). A random effects model with inverse variance weighting procedures was used to calculate ESs. Studies that used gender-specific norms were analyzed separately from studies that used gender-neutral norms. Compared to control participants, students who received PNF reported a greater reduction in drinking from baseline to follow-up. Results were similar for both gender-neutral and gender-specific PNF. Overall, intervention effects for drinking were small but reliable. This study offers an empirical summary of stand-alone PNF for college student drinking and provides a foundation for future research.
YOGA INTERVENTIONS TO ENHANCE PSYCHOLOGICAL AND PHYSICAL HEALTH FOR PEOPLE LIVING WITH HIV: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: People living with HIV/AIDS (PLWHA) often experience psychological stress associated with disease management. Yoga is widely practiced and purported to offer a range of health benefits, including improvements in stress. This meta-analysis examines the benefits of yoga on measures of psychological stress, physiological markers of stress, and disease progression.

Methods: Comprehensive electronic database searches identified 208 unique studies with relevant key terms; of these, 8 studies met our inclusion criteria. Included were studies that (a) evaluated a yoga intervention in PLWHA; (b) provided between-group (i.e., compared yoga to a control condition) or a within-group (i.e., outcomes measured before and after a yoga intervention) changes; and (c) assessed a psychological, physiological, or biomedical outcome. The authors adhere to the guidelines of the Preferred Reporting Items for systematic reviews and meta-analyses (PRISMA). Independent raters coded study, sample, methodological quality, and intervention characteristics. Weighted mean difference (between) and gain (within) effect sizes were calculated using random-effects assumptions.

Results: The eight studies were published between 2004 and 2017; samples included a total of 328 participants (M age = 44 years; 37% women; M years living HIV = 12). The studies were conducted in the North America (5) and India (3). Yoga components included breathing techniques, physical movement/postures, and meditation practice. The most commonly reported outcome measures were stress, depression, and quality of life. Findings from between-group design studies showed that PLWHA who received the yoga intervention reported significant improvements in perceived stress, positive affect, and anxiety compared to controls (d+s = 0.71-0.80). Findings from within-groups design studies showed improvements in anxiety, depression, sleep quality, and quality of life following the yoga intervention (d+s = 0.28 – 1.13). No significant changes were observed in biomarkers of HIV (e.g., CD4+ counts) for between- or within-groups.

Conclusion: Yoga is a promising intervention for the management of distress among PLWHA. However, the literature is limited due to the small number of studies, lack of objective outcome measures, and inadequate blinding of researchers. More rigorous RCTs (e.g., active control groups, longer follow-up duration) with objective measures of HIV-related outcomes are needed to further evaluate the benefits of yoga for PLWHA.

Funding Statement: Eugene M. Dunne, PhD was supported by the Adolescent/Young Adult Biobehavioral HIV Training Grant (T32MH078788; PI: Larry K. Brown, MD) from the National Institute of Mental Health. The research was also supported by the National Center for Complementary and Integrative Health of the National Institutes of Health (R01-AT008815; PI: Lori A. J. Scott-Sheldon, PhD). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.
Partial hospitalization programs provide specialized, intensive psychiatric day treatment for children with significant social, emotional, and behavioral needs warranting more intensive care and services than outpatient therapy in a less restrictive setting than inpatient hospitalization. Due to sparse analysis of the long-term outcomes of these programs, the Bradley Hospital Children’s Partial Hospital Program (CPHP) conducted a pilot outcomes study to investigate its impact on children’s overall functioning and transition to outpatient therapy, home, and school since discharge while improving the program’s follow up survey completion rate by administering surveys via phone. Qualitative survey data from families of 55 patients ages seven to twelve who participated in the CPHP between January 2015 and April 2016 suggest an overall positive impact of partial hospitalization on parent-reported child functioning, mental health service utilization, and adjustment to home and school environments. Reported treatment effects persisted beyond program participation, ranging from three to 18 months post-discharge. Additionally, 53 of 55 families reported ongoing engagement in follow up mental health treatment. Parent perspectives on elements of the CPHP’s interdisciplinary care approach were assessed in the context of current child functioning, including referrals for follow-up care, successful home and school transitions, therapist and staff relationships, and overall program structure. Of note, the CPHP has continued to utilize the follow up survey developed for this study to aggregate ongoing data on the impact of their program on the aforementioned treatment outcomes.
Objective: Posttraumatic stress disorder (PTSD) and major depressive disorder (MDD) are associated with changes in white matter integrity (WMI). It is unclear how this relationship might affect treatment response to repetitive transcranial magnetic stimulation (rTMS). We examined the association of baseline WMI with pre- and post-rTMS symptoms in patients with comorbid PTSD and MDD.

Participants & Methods: Participants (n = 22, subset of larger cohort; mean age = 53) underwent pre-rTMS MRI with diffusion imaging and completed self-report measures of PTSD (PCL-5) and MDD (IDS-SR) pre- and post-rTMS. Participants received up to 40 unblinded rTMS sessions delivered at 5 Hz to left dorsolateral prefrontal cortex. We used the TRACULA toolbox to evaluate WMI (fractional anisotropy, FA; mean diffusivity, MD; radial diffusivity, RD) in fronto-temporo-limbic (FTL) pathways associated with PTSD and MDD: the forceps minor, bilateral cingulum, and uncinate fasciculi. We chose the bilateral angular cingulum and corticospinal tract as pseudo-control pathways. The association between WMI and pre-rTMS symptom severity, and post-rTMS percent symptom change in PTSD and MDD outcomes, were examined using linear regression after covarying for age and gender.

Results: Pre-rTMS: WMI was not significantly associated with PTSD or MDD symptom severity (FTL and non-FTL tracts). Post-rTMS: Forceps minor and left uncinate fasciculus were significantly associated with percent symptom change in both PTSD (p<.03) and MDD (p<.04). One pseudo-control tract (angular cingulum) was significantly associated with percent symptom change in both PTSD (p<.02) and MDD (p<.04).

Conclusions: Lower diffusivity, but not higher anisotropy, in FTL pathways is related to greater symptom improvement in PTSD and MDD following rTMS. This suggests that the relationship may not be driven by axonal integrity but rather by other factors that impact white matter diffusion.
EFFECTS OF ALCOHOL, INTRAPERSONAL, AND CONTEXTUAL FACTORS ON UNPLANNED MARIJUANA USE IN ADOLESCENTS: AN EVENT-LEVEL STUDY

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Marijuana is the most commonly used illicit drug in the US, with highest prevalence rates among adolescents and young adults. Although the harmful consequences of marijuana use are well documented, reasons for the high prevalence of marijuana misuse among youth remain poorly understood. Impaired control or ability to limit use is one of the earliest-developing signs of problem drinking in adolescents; however, this construct has garnered limited attention in marijuana research. Little is known about the characteristics of impaired control over marijuana use or for whom and under what conditions impaired control is expressed. In this study, we sought to identify contextual influences, including alcohol use and intrapersonal and environmental factors, on unplanned marijuana use among youth seeking help to reduce their marijuana use (N = 85). Ecological momentary assessments captured affective and contextual factors in real time in youths’ real world settings during a 3- to 14-day monitoring period before youth were randomized in a larger clinical trial. We hypothesized that impaired control over use, defined as using marijuana on day when use was not planned, would exhibit between- and within-person variability. We expected alcohol use, affect (i.e., negative and positive affect, marijuana craving), and environmental factors (i.e., time spent with using friends and in places youth typically use) to be positively related to both between- and within-person variability in unplanned use. Results from multilevel modeling partially supported hypotheses. Forty-seven percent of days were unplanned (294/620), and youth used marijuana on 37% of these unplanned days (ICCs=0.168 and 0.353, respectively). The likelihood and quantity of unplanned use varied between and within persons. At the day-level, alcohol use was positively associated with quantity of marijuana use, whereas positive affect was inversely related to the quantity used. At the person-level, alcohol use and the percent of time with using friends were associated with an increased proportion of days of unplanned use. Person-level craving was associated with increased quantity used on unplanned days while percent of time in places one typically uses was associated with decreased quantity. Results implicate alcohol use in uncontrolled marijuana use among youth and also point to time spent with using peers and craving as important risk factors.
PRELIMINARY ACCEPTABILITY AND EFFICACY OF A BRIEF WEB-BASED THERAPIST ASSISTED ACCEPTANCE-BASED BEHAVIORAL INTERVENTION FOR COLLEGE STUDENTS

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The high rates of anxiety in college students (ACHA, 2014) and the many barriers to accessing evidence-based care in communities and on campuses (Kadison & DiGeronomo, 2004; Stewart & Chambless, 2007) indicate a clear need to explore ways to provide effective evidence-based treatments to more people. Web-based interventions and preventions are one way to bridge this gap, and hold the potential to decrease suffering and mental health disparities (Dimeff et al., 2011).

Previous research has demonstrated that web-based approaches are effective in reducing anxiety in non-college and college samples (e.g., Dahlin et al., 2016; Levin et al., 2017). In addition, meta-analyses have found larger effect sizes and lower dropout rates for supported web-based approaches (e.g., Spek et al., 2007). However, no short-term therapist assisted approaches for anxiety have been examined for students.

The current RCT (N = 156) compared a three-session web-based therapist-assisted acceptance-based behavioral intervention for anxiety (Surviving and Thriving During Stress) versus a waitlist control condition in a sample of college students at a diverse urban university.

Mixed-Effects Regression Models (MRM) were run in SPSS for each outcome to examine the effects of time (pre, post), condition (treatment, WL), and their interaction (time x condition). Models were run assuming random intercepts and slopes. There were significant interactions for general anxiety (DASS-stress; t(88.34)= -2.076, p = .041, d = 0.44), depression (DASS-depression; t(87.41) = -3.73, p = <.001, d = 0.80) and quality of life (QOL; t(91.26) = 2.49, p = .015, d = 0.52). These results indicate that participants in the treatment condition reported significantly greater improvements on these outcomes from pre to post versus participants in the waitlist condition.

In terms of acceptability, the mean rating for overall program helpfulness at post was 7.32 (Likert scale from 1-9, range = 5-9, SD = 1.49) indicating most participants found the program to be helpful.
THE FOOD ALLERGY ADVENTURE (FAA) APP AND COMMUNICATION BETWEEN CAREGIVERS AND CHILDREN WITH FOOD ALLERGIES

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Objective: Pediatric Food Allergy (FA) is a serious chronic condition affecting nearly six million children in the United States. Currently, there is no cure for FA, nor are there medications to prevent food-induced anaphylaxis. FA management is ongoing and requires communication between caregivers and children in certain skill areas (e.g., reading food labels, identifying FA symptoms, understanding the risk of cross-contact). There are limited educational resources available for children with FA; most materials are geared toward caregivers. Food Allergy Adventure (FAA) was designed as an interactive, game-based application (App) for school-aged children with FAs to increase knowledge, improve behavioral skills for disease management, and reduce the risk of food allergen exposure. The FAA App consists of three interrelated elements 1) three experiential scenarios (e.g., school cafeteria, arcade, family picnic) in which the player must navigate FA management challenges; 2) two interactive multi-level games: “Label Learning: Like it or Lose it,” a game to identify food allergens in food labels, and “Reaction Action!,” a symptom identification game; and 3) a token-based reward system to reinforce and encourage application use. For this study, we evaluated the effect of the FAA App on caregiver-child communication regarding FA management using a randomized, controlled design.

Methods: Caregiver-child pairs (N=79) of children diagnosed with FA by a physician (70% male; Mage=9.3 years; 74% non-Latino white, 14% mixed-race, 10% Black, 2% unreported) completed questionnaires providing demographic information and frequency of communication about FA-related topics. Participants were randomly assigned to Standard Care or FAA condition. Those assigned to Standard Care (n=40) attended a brief clinic visit with a food allergy clinician and received educational handouts. Participants assigned to FAA (n=39) interacted with the FAA App for two weeks. Parents and children in each group completed questions at baseline and at a two-week post assessment regarding their communication about FA management.

Results: Child participants did not report increased communication regarding FA topics discussed from baseline to follow-up. (t=.12, p=.2). In contrast, caregivers across both groups reported an increase in number of FA topics discussed post-intervention (t=2.4, p<.05; d=.30). Specifically, caregivers reported an increase in discussion with their child about FA symptoms (t=3.0, p<.05; d=.39), how others might react to their child’s FAs, including bullying or teasing, (t=2.0, p<.05; d=.25) and about ways their child can explain FAs to others (t=2.4, p<.05; d=.29). Caregivers of children in the FAA condition reported a greater increase in overall number of FA topics discussed relative to those in the Standard Care condition (F(1, 59)=4.4, p<.05; ω²p=.07), greater discussion about reading food labels with their children (F(1, 59)=3.7, p=.06; ω²p=.06) and more discussion regarding how to explain FA to others (F(1, 58)=3.9, p=.05; ω²p=.06).

Conclusions: Increased communication between caregivers and children with FA has the potential to aid in FA management, reduce the risk of allergen exposure, and reduce the rate of food-induced anaphylaxis. In this study, caregiver-child communication about FA was increased in both the standard care and intervention groups; however, greater communication was observed among the families that used the FAA App across some key areas of FA management (i.e., reading food labels, explaining FA to others). These results suggest that an interactive game-based App may be an effective resource for increasing communication between caregivers and children with food allergies beyond effects of a typical office visit.
Depression is a significant public health burden. While a variety of effective interventions exist, antidepressant treatment is the most commonly used approach and individuals with depression often face barriers to accessing additional empirically-supported psychosocial treatments. The current study surveyed community members with lived experience of depression who volunteered to participate in a project to develop a novel video self-help intervention for depression. This self-help intervention (based on Acceptance and Commitment Therapy) was designed to improve psychological flexibility (PF). PF refers to one’s ability to attend to the present moment, accept internal experiences, and respond to changing environmental contingencies in the service of valued goals. Low PF has been shown to contribute to depression, and treatments that improve PF have been demonstrated to have a positive impact on depression. We recruited participants with depression from the community who were interested in sharing their personal experiences coping with depression. Participants were interviewed about their experiences coping with depression and completed measures of depression severity, functional impairment, psychological well-being, and level of PF. We hypothesized that higher levels of PF would be associated with lower severity and impairment and greater well-being. Participants were additionally asked about their treatment experiences and willingness to try various treatment options to understand the feasibility/acceptability of self-help interventions for these individuals. The sample (n = 32) was 74% female, 83% White, and 14% Hispanic/Latino, with a mean age of 48.3 and mean education level of 13.5 years. A significant correlation (r = -.80, p < .001) was found between PF and depression severity, with higher levels of depression indicating lower PF. Lower depression symptom severity also was associated with various components of PF, including higher levels of mindfulness (r = -.69, p < .001), greater progress in valued living (r = -.73, p < .001), and lower obstruction to valued living (r = -.90, p < .001). Additionally, greater PF was associated with higher levels of psychological well-being (r = .68, p < .001) and lower psychosocial impairment (r = -.56, p = .001). Narrative interviews with participants indicated their use of coping skills (such as acceptance and mindfulness) consistent with these quantitative findings. In terms of treatment history, the majority of participants (93.5%) reported being prescribed psychiatric medications, with 74.2% currently receiving medications. In addition, 90.3% reported a history of counseling or psychotherapy (including 54.8% currently). Further, 38.7% reported trying self-help treatments. Participants also rated the acceptability of different depression treatments on a scale from 1 (“definitely would not try”) to 7 (“definitely would try”). They rated individual counseling/psychotherapy as the most preferable treatment option, with a mean rating of 6.52. This was followed by exercise (M = 5.90), antidepressant medication (M = 5.45), and book or internet-based self-help (M = 5.29). Participants rated electroconvulsive therapy (M = 2.17) and inpatient treatment (M = 3.50) as the least preferable treatment options. The results of the current study suggest that among individuals who report some success in coping with their depression, PF mechanisms may contribute to improved symptoms, functioning, and well-being. Additionally, given that study participants generally preferred psychotherapy and rated self-help interventions as acceptable as antidepressants, there seems to be a clear role for the use of these non-pharmacological treatment options in improving PF. Our self-help intervention will feature a subset of participants from the current study who were willing to share their coping strategies for depression on camera so that others may benefit from their experiences.
In recent years, the Veterans Affairs (VA) system has been sharply criticized for its ability to provide timely and appropriate care to Veterans. This criticism highlights the importance of program evaluation and implementation to improve operations at a system level. Consistent with the goals and priorities outlined in the VA system’s VHA and VISN 1 Strategic Plan, program evaluation serves to enhance services in an effectively integrated health care delivery system that is responsive to the needs of Veterans, staff and key stakeholders. The Providence VA Medical Center (PVAMC) provides several client-centered therapies to best serve the Veteran community in modalities such as individual, group, couple, and family therapy. Because of the complex and diverse needs presented by Veterans, PVAMC relies on program evaluation to guide treatment implementation and promote best practices for Veterans’ psychological recovery. Such efforts have resulted in the development of an LGBTQI Wellness Group to aid Veterans who identify as gender and sexual minorities in achieving personally meaningful goals. Discussion of a group developed at PVAMC will illustrate the rationale for conducting program evaluation as a means to develop novel empirically-based and recovery-oriented interventions for LGBTQI populations. Overall objectives of the presentation are to: 1) Present theoretical support for development of LGBTQI Wellness group, (2) Describe recruitment efforts and number of patients from various recruitment streams, (3) Present empirical support for LGBTQI Wellness Group, including evaluation of group outcomes at mid-point of treatment (e.g., quantitative data measuring depression, anxiety, quality of life, individualized goal setting, internalized attitudes regarding sexual/gender identity); 4) Present the process of group implementation, including key topics selected and barriers to development; and 5) Highlight advantages of quality improvement projects to enhance best practices in integrated healthcare settings.
THE EFFECTS OF MATERNAL RESPONSIVENESS AND PARENTING STRESS ON INFANT CHRONIC ILLNESS

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Introduction: Previous literature has demonstrated that parental stress is associated with infant physical health (Cousino & Hazen, 2013). Specifically, parents of infants with chronic illness report higher levels of parenting stress compared to those with healthy infants (Goldberg, Morris, Simmons, Fowler, & Levison, 1990). Yet not all infants whose parents are highly stressed experience chronic illness, and little is known about the conditions under which parenting stress impacts infant health outcomes. Previous studies suggest that parenting stress is associated with maternal behavior, including maternal sensitivity and responsiveness (Pereira et al., 2012). We explore maternal responsiveness as a moderator of the relationship between parenting stress and infant physical health outcomes at six months of age.

Research Question: Is parenting stress associated with maternal responsiveness and infant physical health at six months of age? Does maternal responsiveness moderate the relationship between parenting stress and infant physical health outcomes?

Method: The current sample is drawn from an ongoing study of early adversity and maternal-child health. The sample consisted of 142 mothers over the age of 18 who were recruited from Women, Infants, and Children (WIC) clinics throughout Rhode Island. Of the 142 mothers, 41% self-identified as white, 19% identified as black, and 40% identified as other races or biracial. Furthermore, 63% were unemployed, 64% had less than or equal to a high school degree, and 53% had female infants. Research assessments in the home were conducted at six months of infant age, during which mothers completed self-report questionnaires and dyads participated in parent-child interaction tasks. Parenting Stress was measured using the Parenting Stress Index: Short Form (PSI-SF; Abidin, 1995). Maternal non-responsiveness (responding inconsistently or with delay to infant emotional and physical distress signals) was measured using the Maternal Responsiveness Questionnaire (MRQ; Leerkes, 2016). Infant health information was reported by mothers in a structured interview that identified both acute and chronic health conditions of infants during the first six months of life. A total score for infant chronic health conditions was calculated and analyses were conducted using SPSS 23.

Results: Correlational analyses revealed significant associations between parenting stress and maternal non-responsiveness (r = .24, p = .047). Maternal non-responsiveness was also significantly correlated with infant chronic health conditions (r = .17, p = .047). Multiple regression analyses demonstrated that the interaction of maternal parenting stress and maternal non-responsiveness was a significant predictor of infant chronic health conditions (B = .23, p = .010). At high levels of non-responsiveness, parenting stress was significantly linked to chronic infant health conditions (B = .22, p = .032). However, at low levels of non-responsiveness this relationship was no longer significant (B = -.12, p = .277).

Discussion: Results suggest that mothers with increased levels of non-responsiveness have infants with a greater number of chronic health conditions. Non-responsiveness was also found to be a significant moderator of the relationship between parenting stress and infant chronic health conditions. This suggests that mothers’ parenting behavior can buffer or exacerbate the effects of stress on infant physical health. Findings from this study indicate that targeting parenting behavior and reducing parenting stress may improve physical health outcomes for infants.
BRAIN ACTIVATION DURING CHANGES IN ACTION INTENTION IN OBSESSIVE-COMPULSIVE DISORDER

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Introduction: Obsessive-compulsive disorder (OCD) is a neuropsychiatric disorder marked by intrusive thoughts and repetitive, ritualistic actions, with a hallmark symptom of performing ritualized compulsions, often to the exclusion of goal-directed behaviors. This behavior suggests possible impairment in using external or internal cues to shape behavior appropriately. We examined adaptive flexibility in OCD by studying brain activation during a "Change-of-Mind" (CoM) task, as a probe for behavioral flexibility and a "target-jump" task that used visual signals requiring participants to change their intended movement to a new end-point. Moreover, we hypothesized that persons with OCD will show differential brain activity in the frontal-striatal brain networks, compared to age-matched healthy volunteers.

Methods: We recruited patients with a DSM-IV diagnosis of OCD, verified by semi-structured clinical interview, and clinically significant OCD symptoms (Yale-Brown Obsessive Compulsive Scale ≥ 16; Goodman et al. 1989). We also recruited age-matched healthy adults. For the CoM task, participants viewed a random-dot pattern that had varying coherence levels (0 to 51% coherence) and moved their arm to "capture" one of two targets (±20° from central gaze) based on the perceived apparent motion of the dot display, which extinguished at movement onset. For the target-jump task, participants performed three sub-tasks, all visually guided by always present targets: (1) direct movement to a target; (2) a via-point movement which required participants to perform an arced movement that passed through an intermediate "via-point"; and (3) a target jump task that required participants to change their intended movement direction by a shift in the end-point target occurring immediately after movement onset on 25% of the trials.

We measured gradient-echo BOLD signals during all tasks using a 3T Siemens Prisma. We used a standard two-stage analysis strategy to assess group-level differences between conditions, separately for the CoM and target-jump tasks.

Results: For the CoM task and consistent with prior observations (Resulaj et al. 2009), OCD patients and controls changed the direction of their initial movement on a small percentage of events. The OCD patient group exhibited about one-half the proportion of CoM events than controls. During CoM events, the OCD patient group exhibited less activation than controls in the pre-genual region of the anterior cingulate and prefrontal cortex anterior to this cingulate region, but showed more activation than controls in a posterior cerebellar region. For the three target jump tasks, OCD patients and controls had similar reaction and movement times and accuracy. For the direct and via-point tasks, we found similar brain activation patterns for the OCD patients and controls. By contrast, OCD patients showed less activation in the lingual gyrus, superior parietal lobule, medial thalamus, and an anterior cerebellum region during the actual target-jump events.

Conclusions: The current results demonstrate brain activation differences between OCD patients and age-matched controls when action intentions become modified due to internal and external influences, but only behavioral differences for internally generated changes in action intention. OCD patients showed lower activation in frontal regions that have interconnections with striatal structures implicated in OCD, suggesting that these neocortical regions could represent targets for therapeutic intervention.
EXAMINATION OF ATTENTION, EXECUTIVE FUNCTION, AND MEMORY AS PREDICTORS OF MORTALITY RISK IN OLDER ADULTS WITH SYSTOLIC HEART FAILURE

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Background: The prevalence and impact of cognitive impairment in heart failure (HF) is increasingly recognized. Converging evidence points to cognitive impairment as predictive of prognosis, when global cognitive function is assessed with screening tools. Additional work is needed to understand which domains of cognitive function are most related to outcomes. Therefore, the present study examined associations among domains of cognitive function assessed via a comprehensive neuropsychological battery and mortality risk in HF.

Methods: Attention, executive function, and memory were assessed in patients with systolic HF participating in an observational study of self-management behavior. Mortality data were obtained from the National Death Index (median follow-up: 2.95 years). The relationships among each cognitive domain and mortality were assessed with Cox regression. Covariates included gender, HF severity, comorbidity and depressive symptoms.

Results: Participants were 325 systolic HF patients with a mean age of 68.6 (59% male, 73% Caucasian). Older age, male gender, and higher depressive symptoms predicted increased mortality risk. Following covariate adjustment, better global cognitive function (HR = .95, 95% CI: .91 - .98) and executive function (HR = .95; 95% CI: .91 - .98) were related to decreased mortality risk. Attention and memory were not related to mortality risk in multivariate models.

Conclusions: Better global cognitive function and executive function were associated with better survival in older adults with HF. Future research to understand the mediation effect of cognitive impairment on mortality will be important to identify individuals at greater risk for poor outcomes.
IF YOU USE IT, YOU LOSE IT: THE MODERATING ROLE OF USER ENGAGEMENT WITH A WEIGHT LOSS MOBILE APP

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Background: Given the established relationship between dietary lapses and weight loss failure, we developed a smartphone-based just-in-time adaptive intervention (JITAI) to prevent dietary lapses (called OnTrack). OnTrack seeks to predict and prevent dietary lapses through the provision of tailored, momentary interventions when risk for lapse is high. OnTrack has been associated with meaningful weight losses and reduced dietary lapses in our recent open trial. The current study sought to further understand the effectiveness of OnTrack by examining (1) the relationship between the proximal outcome (e.g., dietary lapses) and distal outcome of weight loss, and (2) the effect of app usage on the proximal-distal relationship.

Methods: Overweight/obese (n=43) individuals used OnTrack during an 8-week mobile weight loss program. OnTrack assessed lapses and relevant triggers via repeated sampling methods (e.g., short surveys throughout the day), delivered in-the-moment alerts to lapse risk, and contained a library of interventions. Outcomes of interest were percent weight loss (at final assessment) and total lapses reported.

Results: When controlling for survey response rate, there was not a significant association between lapses and weight loss (β=.10, p=0.53). Additional multiple regression models revealed that the relationship between lapses and weight loss was dependent on completion of surveys (β=.34, p=.04) and library access (β=-.50, p<.01) such that individuals with greater app use demonstrated the expected relationship between lapses and weight loss. The moderating role of percentage of in-the-moment alerts opened was non-significant (β=.26, p=.12).

Conclusions: For those using OnTrack consistently, fewer total lapses were related to greater weight losses. However, this relationship was not present among those who engaged with the app less. Results confirm that lapses are a viable proximal outcome for weight loss JITAI and highlight important methodological issues related to app-based treatment and assessment.
Background: Cognitive Bias Modification (CBM) is a computerized treatment for anxiety disorders that aims to alter attention and interpretation biases towards potentially threatening situations. To date relatively few studies have examined the feasibility and acceptability of CBM treatment in real world settings, and none have implemented CBM in primary care, where most people receive their mental health treatment.

Methods: We conducted structured, qualitative exit interviews with 13 primary care patients diagnosed with generalized anxiety disorder, social anxiety disorder, and/or panic disorder after they completed a CBM treatment. Interview questions pertained to satisfaction with the structure of the study and the length/frequency of treatment sessions, perceived feasibility of completing the treatment sessions in a primary care setting, and reactions to treatment rationale and user-friendliness of the computer program. Two trained research assistants transcribed the interviews and independently coded the transcriptions. Codes were then compared and differences were resolved by consensus, creating themes and categories that best captured patients’ experiences.

Results: Patients indicated that the CBM treatment improved their quality of life and reduced their anxiety-related symptoms. Frequency and length of treatment sessions were generally found to be acceptable, and patients revealed high levels of satisfaction with the CBM program. Patients preferred the option of completing the sessions in the clinic rather than at home, citing the potential for distractions and a lack of computer or internet service. Patients wished for more communication and involvement with their primary care physician throughout the program. The CBM program was seen as user-friendly with a simple and easy-to-use interface. Patients found the situations depicted in the interpretation training task to be highly relatable and applicable to anxiety provoking situations, but many reported lack of understanding and engagement with the attention training task.

Conclusions: Overall, the CBM treatment program was found to be feasible and acceptable in a primary care setting. Improvements should be made in explaining the treatment rationale for the attention paradigm and incorporating greater primary care physician involvement. Future qualitative studies should further evaluate attitudes towards CBM.

Keywords: Cognitive bias modification, attention, interpretation, anxiety, qualitative, treatment, technology, primary care
CONTROLLED TRIAL OF VENTRAL CAPSULE/VENTRAL STRIATUM DEEP BRAIN STIMULATION FOR INTRACTABLE OCD: ONE YEAR OUTCOMES

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Introduction:
Deep brain stimulation (DBS) has regulatory approvals in the EU and the US for treatment-intractable obsessive-compulsive disorder (OCD), but only limited controlled data are available.

Methods:
This collaborative multicenter controlled trial, conducted across eight U.S. centers, tested the effects of ventral capsule/ventral striatum (VC/VS) DBS in 27 rigorously selected patients suffering from otherwise intractable OCD. The trial used a delayed-start, sham-controlled design. The Medtronic model 3387 brain lead used has four independently programmable electrode contacts, each 1.5mm long, spanning 10.5mm overall. It was chosen, in part, because this device can access ventral prefrontal- subcortical connections traveling in the VC/VS which are implicated in OCD. The lead was attached to an implantable neurostimulator (INS; Activa PC) for the masked study phase, which was replaced by a rechargeable Active RC INS (Medtronic, Inc.) to minimize the need for battery replacement surgeries during chronic stimulation after controlled data were collected. During the sham-controlled DBS optimization phase and subsequent stimulation adjustments, specific electrode contacts along the length of the model 3387 lead were chosen based on acute and ongoing clinical effects.

Results:
DBS contacts producing therapeutic effects spanned the dorsal-ventral distribution of the 3387 lead. Similar to those seen to date in open-label trials, encouraging primary measure results from baseline to 12 months were observed. OCD severity and occupational, social, and global functioning measured by YBOCS, GAF and SOFAS showed improvement at the month six rating timepoint when all patients had received active stimulation for at least 3 months. The most commonly reported anticipated adverse events were increased mood and OC-symptom severity, including hypomania, occurring 21 times across 10 patients over the first year of participation. These events were caused and resolved by DBS device setting adjustments. Reports of postsurgical infection occurred in three of 27 patients, two of those three patients decided not to undergo re-implantation prior to completing month 12 follow-up assessments.

Discussion:
Sham controlled outcomes to one year suggest there is benefit from DBS at the VC/VS surgical target for intractable OCD. The fact that the empirically chosen electrode locations and settings differed across patients suggests that the specific locations of pathways involved in therapeutic effects may vary across individuals. This invasive and intensive treatment was generally well-tolerated by the group despite some anticipated adverse effects from DBS.
CATEGORIZING CANNABIS AND ALCOHOL USE PATTERNS OF EMERGING ADULTS IN PSYCHIATRIC PARTIAL HOSPITALIZATION

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Background: Emerging adulthood is a common and problematic time for substance use, particularly alcohol and cannabis use. Additionally, emerging adulthood represents a vulnerable time period for anxiety and depression. Substance use and mental health issues are highly comorbid, yet substance use is often not addressed within the context of psychiatric care. The current study aimed to categorize cannabis and alcohol use patterns of emerging adults in psychiatric care, and to evaluate relationships with use-related problems, psychiatric symptomatology, and motives for use.

Method: Participants were emerging adults (aged 18-26) recruited from the Young Adult Partial Hospitalization (YAPH) program at Butler Hospital, a 5-10 day program running Monday through Friday that includes group therapy, daily individual counseling with a licensed mental health worker, and daily evaluation by an attending psychiatrist who may prescribe psychiatric medication throughout the course of treatment. Participants were approached to complete questionnaires on their second or third day in the program. Questionnaires assessed for use (with the Drug Use Frequency questionnaire), use-related problems (with the Alcohol Use Disorders Identification Test (AUDIT) and the Drug Use Disorder Identification Test (DUDIT)), motives for substance use (with the Modified Drinking Motives Questionnaire-Revised (MDMQR)), and psychiatric symptomatology (with the Center for Epidemiological Studies-Depression and Generalized Anxiety Disorder-7 questionnaires). Of the 318 participants who completed questionnaires, 244 reported cannabis and/or alcohol use (76.7%) over the previous 30 days. Analyses were conducted on participants who reported use (n=244). We utilized a two-step cluster analysis to identify groupings of substance use patterns. Following identification of clusters, Analysis of Variance (ANOVA) models determined differences between clusters in problems, psychiatric symptomatology and motives for substance use. We probed group comparisons post hoc with Least Significant Difference (LSD) tests.

Results: Results from cluster analyses indicated four categories of use: Low Cannabis/High Alcohol” (or LCHA; 35.66%), “Low Cannabis/Low Alcohol” (or LCLA; 17.62%), “High Cannabis/Low Alcohol” (or HCLA; 29.10 %), and “High Cannabis/High Alcohol” (or HCHA; 17.62%). Significant differences were observed between categories in alcohol-related problems (F=176.98, p<.001) and drug-related problems (F=36.75, p<.001), depression severity (F=3.60, p=.01), and all motives for use: social (F=6.12, p<.001), coping with anxiety (F=20.43, p<.001), coping with depression (F=17.79, p<.001), enhancement (F=7.85, p<.001), and conformity (F=4.92, p<.01). Overall, individuals in categories with the highest rates of use and co-use reported higher levels of depression, social motives, coping with anxiety motives, coping with depression motives, and enhancement motives.

Conclusions: Among this sample of emerging adults in psychiatric treatment over three-quarters (76.7%) reported alcohol and/or cannabis use. Results from cluster analyses of substance users suggested that individuals with the lowest reported use of both substances had the lowest levels of depression. Individuals with the highest patterns of substance use reported using for social motives, coping with anxiety and depression motives, and enhancement motives. Heavier-using participants were more likely to use substances to help alleviate psychiatric symptomatology (i.e., to cope), yet also reported higher levels of depression symptomatology and similar rates of anxiety. As such, substance use may not serve its intended purpose and likely heightens negative consequences. This highlights the importance of addressing substance use in psychiatric treatment, as higher rates of use may be associated with more problematic outcomes.
While cutting 50 μm, free-floating sections of skin biopsies to stain immunohistochemically with PGP9.5 antibody is the gold standard to assess intraepidermal nerve fiber length, this technique is beyond the capabilities of most hospital laboratories. While there have been studies correlating the 50-micron technique to electron microscopy of small, unmyelinated nerve fibers in sural nerve biopsies, there has been no similar comparison of intraepidermal nerve fiber area assessed using formalin-fixed, paraffin-embedded (FFPE) tissue to sural nerve electron microscopy. A cohort of autopsy specimens from 2016 for which both distal skin and sural nerve biopsies were available were analyzed for intraepidermal nerve fibers and small, unmyelinated axons, respectively, and the patients' clinical charts were reviewed. Three serial, 10-micron FFPE skin sections were stained with PGP9.5, and the intraepidermal nerve fiber area was calculated based upon the number of positive axons per unit area. Electron microscopy of the corresponding sural nerve biopsies was obtained in a traditional manor. Results indicate a correlation between the intraepidermal nerve fiber areas and the density of small, unmyelinated axons on sural nerve biopsies in most cases, with some cases demonstrating more loss of intraepidermal axons. In conclusion, this is the first study to correlate FFPE intraepidermal nerve fiber area with small, unmyelinated axons on sural nerve biopsies and further validates the FFPE technique for assessing the status of intraepidermal nerve fibers, making it accessible to most laboratories with immunohistochemistry capabilities.
SEVERITY OF DELINQUENCY AS A PREDICTOR OF MENTAL HEALTH
SYMPTOMS AMONG COURT-INVOLVED YOUTH REFERRED FOR TREATMENT

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Justice-involved youth have very high rates of psychopathology (e.g., Teplin et al., 2002). PTSD predicts number of arrests and type of charges among detained youth (Becker & Kerig, 2011) and disruptive behavior disorders predict self-reported breadth of delinquent behavior among youth receiving community mental health services (Vogel & Messner, 2012). However, no research has examined the relationship between type of psychopathology and delinquency severity among court-involved, non-incarcerated youth with identified treatment needs.

Methods
Participants were 164 adolescents recruited for a randomized controlled trial for adolescents court-referred for mental health treatment. Data used in these analyses are from the baseline assessment. Participants were 57.9% male and ranged from 12 to 17 years old (M = 15.19, SD = 1.35). Youth identified as White (57.9%), multiracial (15.9%), African American (4.9%), Asian (3.7%), American Indian/Alaska Native (1.8%), and other (11.6%); 23.2% of youth identified as Hispanic. Parents of participants reported household income; 57.4% reported income under $40,000, 17.9% reported income from $40,000 to $80,000, and 24.7% reported income above $80,000.
Psychopathology was measured using the Youth Self-Report (YSR) and the Child Behavior Checklist (CBCL; Achenbach, 2001), self-report measures completed by participants and their parents. For both measures, the Total Problems, Externalizing Problems, and Internalizing Problems scales were included in analyses, using dichotomized T-scores utilizing the Borderline cut-off of 65.
Youth delinquency was measured using the National Youth Survey questionnaire (NYS; Elliott et al., 1985), a self-report measure of 40 types of delinquent behavior. Using YSR data, youth were divided into three categories: those who reported ever committing a violent crime; those who reported ever committing an index offense (i.e., serious crimes tracked by the federal government) but reported never committing a violent crime; and those who reported never having committed either a violent or index offense.

Results
Preliminary analyses assessed the relationship between demographic variables and scores on the YSR and CBCL. Because Internalizing Problems on the YSR significantly differed by household income level, F (2, 142) = 3.76, p = .03, η² = .05, it was included as a covariate in analyses including Internalizing Problems.
Logistic regression analyses were conducted to examine the extent to which delinquency severity would predict probability of being in the Borderline range or above on the YSR or CBCL Total, Internalizing, or Externalizing Problems scales.
A binomial logistic regression equation revealed that delinquency level (non-violent non-index vs. non-violent index) significantly predicted YSR-Externalizing T-score of 65 or above; b = 1.06, SE(b) = .52, p = .040, Wald = 4.22, OR = 2.89. Delinquency level (non-violent non-index vs. violent) also significantly predicted CBCL-Externalizing T-score of 65 or above; b = 1.08, SE(b) = .36, p = .003, Wald = 9.12, OR = 2.93. Delinquency Level explained between 3.7% and 5.0% of the variance in YSR-Externalizing and explained between 6.2% and 8.4% of the variance in CBCL-Externalizing.
Delinquency level did not significantly predict YSR or CBCL Total or Internalizing Problems.

Discussion
Among non-incarcerated youth court-referred for mental health treatment, delinquent youth who have committed only minor, non-violent offenses are less likely to have externalizing problems, but do not have significantly different internalizing problems from youth with more severe delinquency. Results suggest externalizing symptoms should be carefully evaluated and targeted for youth with more severe delinquency, and all court-involved youth who appear to have potential for psychiatric concerns should be assessed for internalizing problems. Policy implications and study limitations will be discussed.
HIGHER DISPOSITIONAL MINDFULNESS IS ASSOCIATED WITH BETTER MEDICATION ADHERENCE IN PATIENTS WITH CARDIOVASCULAR DISEASE

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Background. Poor adherence to medical regimens is highly prevalent among patients with cardiovascular disease (CVD) and has an unfavorable impact on health outcomes. Among patient-level predictors of adherence, attention lapses have been associated with worse adherence. We sought to evaluate whether higher dispositional mindfulness, i.e., a greater “ability to pay attention on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn, 1990) is associated with better medication adherence.

Methods. We conducted a baseline cross-sectional analysis among patients with chronic CVD and no prior Mindfulness Based Stress Reduction (MBSR) training enrolled in a study of MBSR. Spearman correlation and linear regression were used to assess the association between dispositional mindfulness (Five Facets of Mindfulness Questionnaire [FFMQ-15], a 15-item measure with higher scores indicating greater mindfulness) and medication adherence (Morisky Medication Adherence Scale [MMAS-8], a self-reported measure with a 0-8 score range, and scores of 8, 7-6, and <6 indicating high, moderate, and low adherence, respectively). Covariates included age, sex, education, self-reported number of medications, and social support (Multidimensional Scale of Perceived Social Support). It was hypothesized that higher dispositional mindfulness would be associated with better medication adherence.

Results. Participants were 31 adults with CVD (20 females, 11 males; 93% white; mean age = 71 ± 6.7 years) taking an average of 6.3 ± 5.4 medications per day. MMAS-8 scores ranged from 1.5 to 8, with 60% of participants reporting suboptimal medication adherence. Correlational analyses indicated that medication adherence was not associated with patient age, sex, education, social support, or number of medications (all p > 0.05), but was significantly associated with dispositional mindfulness (Spearman rho = 0.47, p = 0.009). Regression analyses indicated that dispositional mindfulness predicted medication adherence ($\beta = 0.1$, 95% CI = 0.01, 0.14; p = 0.03).

Conclusions. In this observational, cross-sectional study, higher dispositional mindfulness was associated with better self-reported medication adherence, suggesting that mindfulness training may play a role in improving medication adherence. Randomized controlled trials are needed to determine the effect of mindfulness training on improving medication adherence.
EMOTIONAL PREDICTION ERRORS PREDICT DECISIONS TO PUNISH

Joseph Heffner, BS, Jae Young-Son, Oriel FeldmanHall, PhD

Prominent theories of punishment propose that being treated unfairly elicits negative emotions (e.g., anger, frustration), which motivate decisions to punish the perpetrator. It remains unknown, however, whether decisions to punish are driven by the emotional experience at the time of being treated unfairly, or if instead, decisions are guided by emotional prediction errors (i.e., violations of one’s affective expectations). Using a novel task to measure emotional experiences and emotional prediction errors in the Ultimatum Game, we found that the valence experienced at the time of unfair treatment predicts decisions to punish, while arousal did not. Interestingly, we further found that valence prediction errors play an even greater role in motivating decisions to punish. These results suggest that emotional prediction errors are more predictive of decisions to punish than experienced emotions.
TOWARDS SPATIAL LOCALISATION OF SENSORIMOTOR RHYTHMIC ACTIVITY: COMPARISON OF CONVENTIONAL METHODS AND TRIPOLAR CONCENTRIC RING ELECTRODES

Sarah Ismail Hosni, MSc, W. Besio, Y. Shahriari

Introduction:
Accurate estimation of the underlying cortical potentials for Motor Imagination (MI) are key for successful non-invasive sensorimotor rhythms (SMR)-based brain-computer interfaces (BCIs). Currently, spatial localization for efficient neural decoding of the cortical motor area is performed by applying spatial filtering methods. It has been shown that among conventional EEG spatial filters including Large Laplacian (LLAP), small Laplacian (SLAP) and common average referencing (CAR), the most enhanced localization and reduced signal-to-noise ratio (SNR) can be achieved by applying LLAP in a SMR-BCI task [McFarland et al., 1997]. Recent studies have shown that tripolar concentric ring electrodes (TCREs) enhance the spatial resolution and selectivity of the surface electrical activity by estimating the surface Laplacian directly through the nine-point method with significantly higher spatial resolution than conventional EEG recordings [Besio et al., 2006; Koka et al., 2007; Makeyev et al., 2013]. This study explores the differences in spatial filtering characteristics between the conventional spatial filtering methods and tripolar EEG recording (tEEG) using TCREs.

Materials and Methods:
Five healthy subjects performed MI tasks (left/right hand). The subjects wore an elastic cap with 16 electrodes, recording from 8 locations (FC3, FC4, C1, C2, C3, C4, CP3, CP4). The tEEG was recorded with TCREs and the t-Interface 20 (CREmedical) pre-amplifier. The signal was then amplified using a g.USBamp (g.tec). All the stimulation presentation and signal monitoring were performed using BCI2000. Data were sampled and digitized at 1200 Hz and a zero-phase bandpass filter (1-200 Hz) was applied to both EEG and tEEG recordings. Each subject attended 3 runs, 10 trials each, for each MI condition following a rest, recorded in one day. Power values were averaged over Mu [8-13 Hz] and Beta [14-30 Hz] bands across each MI condition. Time-frequency maps were calculated based on Morlet wavelet decomposition (3-30Hz). To quantify the spatial localization features of EEG, tEEG, LAP-EEG, CAR-EEG, and SLAP-EEG, correlation analysis (Pearson r²) was used to measure the proportion of variance of the EEG power that was accounted for by the MI task and rest which reflects SNR and localization.

Results:
Comparison of r² correlations values for each EEG type averaged over all subjects and trials for both Mu and Beta bands revealed more prominent spatial localization in case of right MI versus left. Localization was more obvious in the Mu band for all cases except tEEG which demonstrated both higher contralateral hemisphere localization and correlation to the body part MI for both Mu and Beta bands. The maximum r² values were achieved with tEEG: 0.3139, 0.2564, 0.1716, and 0.1603, for Mu-Left, Mu-Right, Beta-Left, and Beta-Left respectively.

Discussion:
This study emphasizes the importance of spatial filtering for localized activity in a SMR-BCI task. tEEG demonstrated apparent superiority in terms of activity localization and correlation values consistent across the bands of interest. However, the conventional spatial filtering methods might suffer from low number of channels which might have biased the results. In contrast, this highlights the superiority of tEEG in terms of the need for relatively few electrodes, and thus, less density EEG recording in a SMR task. Moreover, notably, tEEG was the only modality to clearly capture SMR characteristics in the Beta band with relatively high correlation.

Significance:
Spatial mechanism of tEEG recording on localization of neural activity from the motor area is highlighted, which can have application in multidimensional control of prosthetic devices and less demand to high-density EEG recordings.

Acknowledgement: Research reported here was supported by the Institutional Development Award (IDeA) Network for Biomedical Research Excellence from the NIGMS of the NIH under grant number P20GM103430.
NUTRITIONAL BELIEFS AND INTENTIONS AMONG FOOD PANTRY CLIENTS IN AN URBAN SETTING

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Background. Americans from food insecure households consume lower quality diets and are at greater risk for chronic diseases as compared to those from food secure households.

Objective. To examine how the health beliefs of food pantry clients relate to the foods they intend to select from a food pantry and to identify barriers they face in adopting a healthy diet.

Design. In this cross-sectional study, food pantry clients completed a survey that assessed their perception of the four Health Belief Model (HBM) constructs: 1) susceptibility to and 2) severity of chronic disease and 3) benefits of and 4) barriers to following a healthy diet to reduce chronic disease risk; inquired about their intention to select 20 foods from the food pantry; and asked about additional barriers they face in adopting a healthy diet.

Participants/Setting. Fifty-one participants were recruited from a Rhode Island food pantry based on their frequency of use (>2 visits/month).

Main Outcome Measures. Intention to select “healthy” versus “unhealthy” foods at the food pantry

Statistical Analyses. Partial Pearson correlations, controlling for age and sex, were determined for each construct of the HBM and each identified barrier with the number of healthy and unhealthy foods participants intended to select from the food pantry.

Results. The four constructs of the HBM were not significantly correlated with the intention to select healthy foods. Perceiving barriers to healthy eating within the HBM was correlated with intention to select unhealthy foods (r=-.41, p=0.003). Lack of transportation (r=-0.41; p=0.004) and taste of healthy foods (r=-0.34, p=0.01) were also significantly correlated with intention to select unhealthy foods.

Conclusions. Efforts are needed to reduce barriers to healthy eating among food pantry clients. Dissemination of effective interventions that address issues of access to and cost of healthy foods is needed.
Alcohol Use Disorder is prominent in the United States, affecting 16 million people. The neurobiology underlying the rewarding aspects of alcohol is unclear. Drosophila show long-lasting memories for the appetitive properties of alcohol intoxication. We recently found a role for Scabrous, a secreted fibrinogen-related peptide that regulates Notch signaling in these memories using a forward genetics approach. Furthermore, we have shown that Scabrous is necessary in the mushroom body, a learning and memory center in the Drosophila brain, for alcohol memory formation. Scabrous is important in these memory circuits but their function is unknown. In order to understand Scabrous’ function, I sought to characterize the expression pattern of Scabrous protein in the adult brain using immunohistochemistry. I hypothesized that there would be different levels or localization of Scabrous protein in scabrous mutants (sca5-120) compared to wild-type flies. First, I found that Scabrous showed widespread, low level expression in the mushroom bodies of wild-type flies. Second, I found that these levels were reduced in sca5-120 mutants relative to wild-type flies. This work is an important characterization of Scabrous’ function in adult Drosophila memory circuits.
HOPELESSNESS AND DYSFUNCTIONAL ATTITUDES AS PREDICTORS OF SELF-REPORTED SELF-EFFICACY IN SEEKING MENTAL HEALTH CARE

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Background: Although mental health disorders affect individuals all over the globe, these individuals tend to have low help-seeking behaviors (Gulliver et al., 2010; Steel et al., 2014). Stigma, low emotional intelligence, and suicidality have all shown to be related to lower levels of help-seeking among individuals with a psychological disorder (Conner et al., 2010; Gulliver et al., 2010; Rickwood, 2007). Hopelessness plays a significant role in the development of many psychological disorders, such as depression and suicidality (Beck, 1967). Additionally, hopelessness has a strong relationship with suicidality and low emotional competence, both which have been shown to be related to low help-seeking behavior (Ciarrocchi, 2000; Kovacs et al., 1985; Mazza & Reynolds, 1998, Storrie et al., 2009). Dysfunctional attitudes have a negative impact on individuals’ well-being and have consistently demonstrated a relationship with hopelessness (Cannon et al. 1999; Olinger 1987).

Purpose: Despite the impact of hopelessness on the likelihood of seeking mental health treatment in students, no research has been done to explore how hopelessness or dysfunctional attitudes impact self-efficacy in seeking mental health treatment among an adult psychiatric inpatient population. The present research seeks to explore the relationship between hopelessness, dysfunctional attitudes, and self-efficacy in seeking mental health treatment among an adult psychiatric inpatient population. We hypothesize that hopelessness and dysfunctional attitudes will predict self-reported self-efficacy in seeking mental health treatment.

Method: Participants included 244 psychiatric inpatients aged 18-70 (M=40.37; SD= 13.65), 52.2% male, 77.7% White, who were recruited as part of two larger, ongoing studies of suicide risk. Hopelessness was measured using the Beck Hopelessness Scale (Beck et al., 1974), dysfunctional attitudes were measured using the Dysfunctional Attitudes Scale (Weissman & Beck, 1978), and self-reported help-seeking was measured using the Self-Efficacy to Seek Mental Health Care scale (Moore et al., 2015).

Results: A multiple linear regression in which all the variables were entered simultaneously was used to predict self-efficacy in seeking mental health care based on hopelessness and dysfunctional attitudes. A significant regression equation was found F(2, 242) = 26.21, p < .001 with an R2 of .178. Here, dysfunctional attitudes significantly predicted self-efficacy in stated willingness to seek mental health care (B=.13 p < .001 as did hopelessness (B=-.51 p < .001)

Conclusions: Our study suggests that hopelessness scores measured by the Beck Hopelessness Scale and dysfunctional attitudes measured by the Dysfunctional Attitudes Scale predict self-reported self-efficacy in seeking mental health treatment. Although both hopelessness and dysfunctional attitudes significantly predicted self-efficacy in seeking mental health care, our R2 was low, indicating that these two predictors only account for a small portion of the variability in these scores. Although these findings are consistent with previous literature showing the relationship between hopelessness and self-efficacy in seeking mental health care, they also show that there are other factors that better explain the large variability among these constructs. Additionally, these findings also show a relationship between dysfunctional attitudes and self-efficacy in seeking mental health care, but also do not account for the large variability in these constructs.
Background: The examination of caregiver attitudes and stigma towards family members with schizophrenia has rarely been examined. Stigma may lead to social and behavioral factors influencing barriers to treatment and quality of life. The aim of this study was to analyze factors associated with family stigma in Mayan indigenous persons, treated and untreated, with schizophrenia in Guatemala.

Methods: Key informants were used to identify potential Mayan individuals over the age of 17 years with symptoms of psychosis. Treated Mayan individuals were selected from the formal mental health system in Guatemala. Treated and untreated individuals were selected from Guatemala City and the surrounding rural areas. In addition, untreated individuals were selected from Santiago Atitlan, a community with minimal access to medical care and to television at that time. Mayan lay-interviewers conducted a screening interview following obtaining informed consent, and those who screened positive for possible psychosis were interviewed by a psychiatrist trained in the SCAN interview to confirm a diagnosis of schizophrenia. Interviews were conducted in Spanish or Tzutijil using a translator. In addition, the psychiatric interview included the Scale for the Assessment of Positive Symptoms and the Scale for the Assessment of Negative Symptoms. The self-identified primary caregiver was interviewed using the Family Interview Schedule, which included measures of stigma, impact of mental illness, caregiver coping, family involvement, and behavioral symptoms.

Bivariate analysis was conducted using nonparametric statistics (Mann-Whitney and Kruskal-Wallis test) to examine the relationship of categorical variables with stigma. Pearson correlations were used to examine the relationship between continuous variables and stigma. To identify associations that explain stigma in families, linear regression was utilized.

Results: 144 individuals were identified by key informant and screened; 63 met eligibility criteria, which included a diagnosis of schizophrenia, and 58 caregivers participated (Guatemala City Treated = 13; Guatemala City Not Treated = 6; Rural Guatemala Treated = 13; Santiago Atitlan = 26). Of the 58 individuals with schizophrenia included in the sample, 51.7% were male and 67.2% were single; their age ranged from 17 - 82 years (mean 33.3 ± 13.6). Based on sites, 26 individuals were in treatment for schizophrenia and 32 had no treatment. Of the caregiver informants, 65.5% were females, 59.6% were parents and 51.7% were married or cohabitating. The 14-item stigma scale had a Cronbach alpha = 0.67; mean of 0.7 ± 0.5 (range 0.07 to 2.50). The bivariate analysis showed statistically significant differences between sex of the informant, marital status of the informant, educational level of the informant, number of children individuals with schizophrenia had, treatment status, caregiver burden and stigma. Urban/rural differences, behavioral problems identified by the informant and severity of symptoms were not associated with stigma. The regression model included informant education level, informant marital status, caregiver burden, and number of children for individuals with schizophrenia. Treatment status dropped off. The final model explained 48.5% of the variance was associated with family stigma.

Conclusion: Stigma perceived by family members of individuals with schizophrenia is best explained by factors associated with identified caregivers. Although treatment status was not associated with stigma in the final model, it still should be considered an important factor given the small sample size in this study. This suggests that addressing the treatment gap, especially in indigenous populations, could help reduce perceived stigma within families. Further research is warranted given the limited literature on stigma perceived by families with individuals with schizophrenia and the lack of studies on indigenous communities and mental health.
RESPONSE TIME ASSOCIATED WITH STIMULUS UNCERTAINTY BUT NOT RESPONSE UNCERTAINTY DISCRIMINATES ALZHEIMER'S DISEASE FROM HEALTHY AGING

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Objective: The Hick-Hyman law states that response time (RT) increases linearly with information uncertainty. Two additive components, stimulus and response uncertainty, contribute to this phenomenon. Prior research has demonstrated that representation of stimulus uncertainty is mediated by the cognitive control network (CCN), which is disrupted in Alzheimer’s disease (AD). Thus, we predicted that manipulating stimulus uncertainty, but not response uncertainty, would differentiate AD from healthy aging.

Participants and Methods: Participants were 26 AD patients (6 males; M age = 71.6 years) and 26 elderly controls (EC; 4 males; M age = 76.4). AD patients were significantly younger than EC (p = .02), but groups did not differ in education. Participants completed a card-sorting task in which either stimulus uncertainty (i.e., proportion of each stimulus type) or response uncertainty (i.e., number of sorting piles) was manipulated.

Results: In the response uncertainty condition, there was a linear increase in RT (p < .001) as uncertainty load (in bits) increased. AD patients were marginally slower than EC (p = .056), but there was no uncertainty*group interaction. In the stimulus uncertainty condition, higher uncertainty was associated with a linear increase in RT (p < .001), and there was a main effect of group (p = .005), with slower RTs for AD patients than EC. An uncertainty*group interaction (p = .017) revealed that AD patients had steeper slopes (i.e., greater slowing under high uncertainty) than EC (p = .007).

Conclusions: EC and AD patients did not differ in their sensitivity to increasing burden of response uncertainty, though AD patients were slower to respond overall. However, consistent with presumed disruptions to the CCN in AD, patients had significantly slower RT at higher levels of stimulus uncertainty. This differential sensitivity to stimulus uncertainty may be a potential cognitive biomarker to discriminate between healthy and pathological aging.
COGNITIVE CHARACTERISTICS OF INVESTIGATOR- VS. SELF-WITHDRAWN PARTICIPANTS IN A STUDY OF ADVANCED UPPER LIMB PROSTHETIC DEVICE USE

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Background:
The DEKA Arm is an upper limb prosthesis offering advanced functionality relative to existing devices. Utilizing the DEKA Arm may be more cognitively demanding than using traditional upper limb prostheses because of its greater number of powered movements. Accordingly, assessment of amputees’ cognitive status may be important in identifying appropriate DEKA Arm candidates to ensure optimal independent use, safety, and cost-effectiveness. Prior work showed that attention and cognitive processing speed relate to DEKA Arm user proficiency. This study examined neuropsychological test performance among upper limb amputees enrolled in the VA Home Study of an Advanced Upper Limb Prosthesis and compared scores among individuals who were prematurely withdrawn from the study.

Methods:
The sample included 24 adult upper limb amputees who were withdrawn during the on-site laboratory training phase of the study. Study withdrawal was classified as participant-initiated (W-P, n = 18) or investigator-initiated (W-I, n = 6). All participants underwent baseline neuropsychological evaluation. Investigators determining participant withdrawal did not utilize the results of cognitive testing in their withdrawal determination. Wilcoxon rank sum tests and Fisher’s exact tests were used to compare baseline demographic characteristics and neuropsychological test scores.

Results:
The groups did not significantly differ in terms of baseline demographic characteristics. Compared to W-P participants, W-I participants had significantly worse scores on measures indexing psychomotor processing speed, cognitive set-shifting, and encoding of contextual and non-contextual verbal information (p < .05 for all comparisons). No significant group differences were found on measures of basic auditory attention/working memory, oral processing speed, response inhibition/switching, or delayed recall of contextual and non-contextual verbal information.

Discussion:
Our findings suggest that participants identified by rehabilitation specialists for withdrawal had lower scores on measures of frontal-executive function and cognitive processing speed relative to those who self-withdrew. These results align with prior work showing similar cognitive abilities predicting user proficiency. We propose that neuropsychological evaluation may represent an integral component of future clinical guidelines for advanced prosthetic use.
Background: Psychogenic nonepileptic seizures (PNES) is a costly and disabling disorder commonly found in both civilians and Veterans. Previous studies have shown the effectiveness of manualized treatment for PNES, but access to mental health care still remains a problem, especially for Veterans living in areas without medical professionals who treat conversion disorder. Thus, we evaluated Veterans treated with CBT-informed psychotherapy for PNES, either locally or with computer video telehealth (CVT).

Objective: To compare baseline characteristics and treatment outcomes between Veterans diagnosed with PNES seen locally and remotely via CVT. We hypothesized 1) seizures and comorbidities will improve with treatment and 2) that there are no significant demographic differences between local and remote groups.

Methods: We conducted a retrospective chart review of 32 Veterans diagnosed with video-EEG confirmed PNES to compare demographic, diagnostic, seizure counts and symptom characteristics, as well as treatment outcomes between local and remote patients. All Veterans were given CBT-informed psychotherapy either onsite at the Providence VA Medical Center (n=8) or remotely using CVT (n=24).

Results: No significant differences were found between local and remote groups for variables including sociodemographics, substance use, TBI, age of onset and diagnosis, comorbid diagnoses, EEG, MRI, and medication usage (all p<0.05). An average seizure reduction of 37% per month was observed for both groups (p=0.0005) over the course of treatment. Local and remote Veterans also showed significant improvements in global functioning (GAF) (p=<0.0001) and quality of life (QOLIE-31) (p=0.0076) and reductions in both depression (BDI) (p=0.0303) and anxiety (BAI) (p=0.0074) scores.

Conclusion: Local and remote Veterans with PNES showed no differences in baseline characteristics and treatment outcomes. Whether they were treated onsite or offsite via CVT, both groups showed significant reductions in seizure frequency and comorbid symptoms and improvements in functioning and quality of life. These results suggest that psychotherapy via telehealth for PNES remains a viable option for Veterans across the nation, eliminating one of the many barriers of access to mental health care.
Angelman syndrome (AS), an autism spectrum disorder, is a severe cognitive disorder caused by loss of expression of the maternally inherited allele of the Ube3A gene. This gene encodes the Ube3A ubiquitin ligase that regulates synaptic plasticity and learning and memory. Using biochemical, slice electrophysiology and mouse behavior methods we explore the efficacy of a novel compound, CN2097, to treat Angelman syndrome. Our studies in an Angelman syndrome (AS) mouse model, suggest that the reported reduction in alpha-Ca2+/calmodulin-dependent kinase II (αCaMKII) activity that produces learning deficits, is the result of defective BDNF signaling. Brain-derived neurotrophic factor (BDNF) plays a key role in long-lasting increases in synaptic strength (long-term potentiation; LTP), a synaptic basis of learning and memory. We found that the impaired LTP observed in the Angelman mouse model occurs because of a reduction in the interaction between TrkB and the synaptic scaffold protein PSD-95, leading to attenuated BDNF-induced CaMKII and PI3K (Akt/mTOR) signaling. We designed a novel cyclic peptide, CN2097, that binds with high affinity to the PDZ domains of PSD-95 to enhance the association of PSD-95 with TrkB and restore signaling that is sufficient to rescue LTP impairment observed in the CA1 region of the hippocampus. Assessing behavioral paradigms, we found that CN2097 restored contextual fear memory and improved rotarod performance trials in AS mice. These studies demonstrate that CN2097 can rescue deficits in CaMKII and Akt signaling and reverse the LTP impairment to ameliorate learning deficits. The use of drugs based on enhancing BDNF-TrkB signaling provides a novel treatment approach that has the potential to lead to the first effective therapy for autism spectrum disorders. 

Key words: Autism, BDNF, LTP, synaptic plasticity
TRACTOGRAPHY PROFILES ASSOCIATED WITH TREATMENT RESPONSE TO RADIOSURGICAL CAPSULOTOMY FOR OBSESSIVE-COMPULSIVE DISORDER

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Introduction:
Stereotactic radiosurgical (SRS) lesioning of the anterior limb of the internal capsule remains a treatment option for patients with treatment-resistant obsessive-compulsive disorder (OCD). However, mechanisms behind response remain unclear. To probe whether lesions placed in specific white-matter tracts were related to response, we determined the connectivity profile of responsive vs non-responsive lesions.

Methods:
Bilateral lesions from 16 OCD patients who underwent SRS ventral capsulotomy were hand-traced and then warped to MNI space. Individual patient volumes were labeled "responder" or "nonresponder" based on Yale-Brown Obsessive Compulsive Scale (YBOCS) change from baseline. Composite lesion volumes were created from voxels where >50% of lesion overlap occurred.

As only post-surgical scans were available for lesion tracing, a separate cohort of 7 OCD patients was used for tractography analysis. Probabilistic tractography was performed between all Freesurfer-segmented anatomical ROIs and individually warped capsulotomy lesion volumes. The connectivity of responder and nonresponder lesions to ROIs (number of tracts) was compared for the cortical and subcortical ROI with the highest connectivity difference.

Results:
The YBOCS change of responders (-23.6 ± 7.2) and nonresponders (-9.8 ± 3.5) differed significantly (p<0.001). The responder composite centroid was lateral to the midline (Left: 15.2 mm, Right: 13.9 mm), anterior to the anterior commissure (L: 12.7 mm, R: 12.8 mm), and inferior to the AC-PC plane (L: 5.3 mm, R: 5.2 mm).

Compared to nonresponders, left responder composite volumes had significantly greater connectivity to the ipsilateral caudate (p=0.011) and medial orbitofrontal sulcus (p=0.029). Right responder volumes had significantly greater connectivity to the ipsilateral putamen (p=0.009), and nonsignificantly greater connectivity to the ipsilateral gyrus rectus (p=0.311).

Conclusions:
Preliminary tractography analysis of SRS capsulotomy lesions suggests that more clinically effective lesions are located within medial orbitofrontal-striatal loops, whose altered connectivity has been thought to underlie OCD symptoms. These results can help optimize lesion placement in future studies.
Background: Maternal infection during pregnancy has been linked to increased risk of offspring depression. Evidence suggests that prenatal life is a sensitive period for the establishment of lifelong risk for psychopathology, yet there is limited research targeting bacterial infection as a prenatal risk factor for depression in adulthood.

Aims: To investigate the prospective association between prenatal bacterial infection and adult depression outcomes.

Method: We conducted a prospective cohort study using data from 730 participants in the New England Family Study with a life-time diagnosis of major depression. Prenatal bacterial infection was ascertained based on obstetric histories collected during prenatal visits, in conjunction with medical records routinely gathered at the study hospitals. Infections that pertained to more than one major organ system were defined as multi-systemic infections (e.g., sepsis), whereas those specifically affecting one system were defined as localized infections. Individuals with major depression were identified using structured diagnostic interviews (either the Diagnostic Interview Schedule for DSM-III or Composite International Diagnostic Interview for DSM-IV). Depression outcomes included admission to hospital (a marker of severity) and episode duration (a marker of chronicity).

Results: In analyses adjusting for parental and offspring’s covariates, prenatal exposure to any bacterial infection was associated with both mild (RR: 1.2, 95% CI: 1.0-1.5) and severe depression (RR: 2.2, 95% CI: 1.6-3.1). Similarly, localized bacterial infection was associated with both mild (RR: 1.2, 95% CI: 1.0-1.5) and severe depression (RR, 1.7, 95% CI: 1.2-2.5). Multi-systemic bacterial infection was most strongly associated with severe depression (RR: 2.8, 95% CI: 1.8-4.5) but it was unrelated to mild depression (RR: 0.9, 95% CI: 0.6-1.4). In terms of chronicity of depression, any bacterial infection during pregnancy predicted significantly longer duration of major depressive episode in adult offspring (IRR, 1.7, 95% CI: 1.3-2.2). The effect was stronger for multi-systemic bacterial infection (IRR, 2.1, 95% CI: 1.3-3.3) than localized bacterial infection (IRR, 1.4, 95% CI: 1.1-1.9).

Conclusion: Prenatal exposure to bacterial infection may confer long-term vulnerability for severe and prolonged depression, particularly those affecting more than one organ system. This study suggests that prenatal bacterial infection may increase the risk of depression in adulthood. Public health interventions targeting gestational bacterial infections may have the potential to prevent depression in offspring.

Abbreviations: DSM, Diagnostic and Statistical Manual of Mental Disorders; RR, risk ratio; CI, confidence interval; IRR, incidence rate ratio.
SOCIAL INFLUENCE INCREASES PREFERENCES FOR UNCERTAIN GAMBLES

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BACKGROUND
Should I eat something tasty for lunch or choose a healthier option? Is it the right time to propose to my significant other? Though uncertainty is a pervasive part of daily life, people demonstrate strong aversion to options that are uncertain, even willing to incur costs to choose “safe” options over uncertain ones (Camerer & Weber, 1992). Decades of research have found that people distinguish between different types of uncertainty: though most people find it aversive to make decisions under risk (known outcome probabilities), they find decision-making under ambiguity (unknown outcome probabilities) even more aversive (Ellsberg, 1961; Knight, 1921). How do people resolve decision uncertainty in their everyday lives? Classic work in social psychology finds that uncertainty promotes conformity (Asch, 1956), suggesting that people may potentially utilize information about others’ uncertainty preferences to help inform their own preferences. Therefore, our study examines whether social influence changes individuals’ uncertainty preferences, whether greater decision uncertainty increases conformity, and whether people conform at different rates under risk and ambiguity.

METHOD
40 participants completed a task in which they encountered risky and ambiguous gambles varying in uncertainty (Levy, Snell, Nelson, Rustichini, & Glimcher, 2010). On each trial, subjects chose between the uncertain gamble or a certain $5. Each gamble varied in the amount of risk, ambiguity, and money at stake. Subjects first completed a Solo Phase of the gambling task to indicate their risk and ambiguity preferences in the absence of social influence. Allowing us to examine the effect of social influence on uncertainty preferences, subjects subsequently completed a Group Phase of the same gambling task while observing others’ decisions. Four other individuals’ choices were presented on each trial, and unbeknownst to subjects, the number of people who were shown to choose the uncertain gamble was varied parametrically and deterministically from 0-4 endorsements.

RESULTS
Across both risky and ambiguous gambles, results reveal that people increased their preferences for uncertain gambles as a greater proportion of the group endorsed the uncertain gamble (rmANOVA, Greenhouse-Geisser corrected: F(1.56, 60.98) = 7.66, p = 0.002, η² = 0.16). To further probe how social influence impacted risk and ambiguity attitudes, we used a well-validated model of economic utility that quantifies individuals’ risk-seeking and ambiguity-seeking attitudes (Gilboa & Schmeidler, 1989). Results from this model demonstrate that people increased their risk-seeking attitudes as a greater proportion of the group endorsed risky gambles (rmANOVA, Greenhouse-Geisser corrected: F(2.73, 87.29) = 3.24, p = 0.03, η² = 0.09). However, we did not observe this effect for ambiguity-seeking attitudes (rmANOVA, Greenhouse-Geisser corrected: F(2.84, 90.87) = 0.99, p = 0.40, η² = 0.03).

CONCLUSION
We examined whether preferences for uncertainty are susceptible to conformity. Specifically, whether increasing the proportion of people that chose the uncertain gamble influenced one’s own preference to do so. Results indicated that greater social pressure made people more susceptible to changes in their preferences for uncertainty. Furthermore, proportion of endorsers affect preferences of risk-seeking but not ambiguity-seeking attitudes suggesting separate consequences of conformity dependent on uncertainty type.
Background: The subjective affective experience and enjoyment of physical activity (PA) is a strong predictor of engagement of habitual PA. High levels of negative affect or physical distress during exercise can undermine future engagement in PA. Anxiety sensitivity, the tendency to negatively and fearfully appraise anxiety-related bodily sensations, is a cognitive factor that amplifies the experience of negative affect and physical distress. Theoretically, anxiety sensitivity may inhibit the pleasurable affective experience of PA, which may contribute to lower levels of PA. The current study examined anxiety sensitivity in relation to PA enjoyment, and affective experience before and after moderate-intensity exercise among low-active treatment-seeking smokers.

Method: Participants were low-active treatment-seeking smokers (n = 201, Mean age = 46.2, SD = 11.0; 71.1% female) enrolled in a smoking cessation intervention. At baseline (pre-treatment), participants completed self-report assessments of anxiety sensitivity and tobacco dependence. PA enjoyment was assessed with the Physical Activity Enjoyment Scale (PACES). The Acute Symptoms Self-Rating Scale (11-point rating of mood and anxiety) was completed prior to and immediately following a submaximal exercise test, which was used to index affective experience before exercise and affective response to moderate-intensity PA (change in pre-post affect).

Results: An exploratory factor analysis of the PACES items revealed three correlated factors, reflecting enjoyable physical feelings of PA, negative affect related to PA, and positive affect related to PA. Anxiety sensitivity was significantly negatively correlated with PACES total score (r = -.173, p = .014), and lower enjoyable physical feelings of PA (r = -.176, p = .013) but not negative or positive affect related to PA. Anxiety sensitivity was also significantly correlated with lower mood ratings (r = -.207, p = .003) and higher anxiety ratings (r = .223, p = .001) immediately prior to the submaximal exercise test. Additionally, the exercise bout produced a significant acute affective response evidenced by 0.76 point increase mood rating (Cohen’s d = .52) and 1.24 point reduction in anxiety rating (Cohen’s d = .64). However, every 1 point increase in anxiety sensitivity was associated with 0.02 point increase in anxiety rating from exercise (partial r = .146, p = .040), but not associated with acute mood response.

Conclusions: This is the first study to document the association between anxiety sensitivity, PA enjoyment, and affective response to exercise. Specifically, anxiety sensitivity was associated with lower PA enjoyment, particularly due to physical feelings resulting from PA, and greater negative affect prior to exercise (i.e., higher anxiety, lower mood). Anxiety sensitivity also inhibited the acute anxiety-reduction effect of exercise. Future work is needed to understand how the current findings generalize beyond cigarette smokers. Collectively, anxiety sensitivity is a cognitive vulnerability that if addressed in treatment, could produce increased PA enjoyment and increase the reinforcing value of PA, and in turn, facilitate future greater PA engagement.
POLYPHARMACY IN COMORBID BIPOLAR AND BORDERLINE PERSONALITY DISORDER INDIVIDUALS

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The purpose of this study is to examine rates of polypharmacy, as well as number of classes of psychotropic medication, in a sample of Bipolar Disorder (BP) participants with comorbid Borderline Personality Disorder (BPD). Polypharmacy, the simultaneous use of multiple psychotropic drugs, is an increasingly common clinical practice. While there are numerous studies reporting an increase in the prevalence of polypharmacy in recent years, there are few studies reporting data on the clinical benefits of this practice. Rather, there is growing evidence for the adverse effects associated with polypharmacy. In particular, pharmacological interventions have not been found to be effective for BPD, but many individuals with this diagnosis are prescribed medications. Additionally, patients with BP who are also comorbid with BPD have been found to experience a much more severe course and outcome of BP.

Participants from the Course and Outcome of Bipolar Youth (COBY) study were administered structured clinical interviews and self-reports starting at intake (7-17.11 years). After intake, participants were interviewed a mean of 10.0 times (SD = 3.2), on average every 8.7 months (SD = 5.2). Participants were assessed approximately every 6 months (mean interval 8.2 months) for a minimum of 4 years and a maximum of 15 years (median follow up 11.5 years). The structured interview for DSM-IV personality disorders (SIDP-IV) was administered at the first follow-up after age 18, and at each subsequent follow-up interview, to assess for symptoms of BPD. The number and classes of prescribed psychotropic medications (Antipsychotics, Antidepressants, Stimulants, Lithium and Anticonvulsants, Strattera, Benzodiazepines, Alpha 2 Agonists) using all 15 years of follow-up data were assessed via the Adolescent Longitudinal Interval Follow-Up Evaluation (A-LIFE).

Chi-square analyses were conducted to determine whether there were differences in the presence of polypharmacy between BP participants with and without comorbid BPD. In addition, Cox-regression was used to examine differences in risk for polypharmacy between BP participants with and without comorbid BPD over the course of the 15-year study. We found that at intake, polypharmacy was more prevalent in participants without BPD (62.1%) compared to those with comorbid BPD (30%; χ² (1) = 7.946, p = 0.005). However, across 15 years of follow-up, Benzodiazepines were found to be prescribed more to comorbid BPD participants, who were on a Benzodiazepine for an average of 10.51% of follow up weeks (S.D. = 0.15; t(279) = -2.93, p = .04), compared to an average of 3.18% of follow up weeks (S.D. = 0.10) among participants without comorbid BPD.

Examining the prevalence of polypharmacy in participants with BP compared to those with comorbid BPD furthers our understanding of the factors that may be predictors of polypharmacy, which can in turn lead to more efficient interventions, and better targeted treatment for individuals.
WHITE MATTER HYPERINTENSITIES RELATE TO FUNCTIONAL ABILITY IN INDIVIDUALS WITH MILD COGNITIVE IMPAIRMENT AND DEMENTIA

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Objective: Previous studies show white matter hyperintensities (WMH) correlate with cognitive function, though their relation to functional ability (FxA) is less well characterized. The present study sought to fill this gap in the literature, hypothesizing a negative association between WMH and FxA in individuals with varying levels of cognitive impairment.

Participants and Methods: Magnetic resonance imaging was acquired in 32 volunteers (mean age = 77; 63% female) with mild cognitive impairment (n = 18), mild dementia (n = 10), or moderate to severe dementia (n = 4). Data processing was implemented in FSL. Intensity thresholded FLAIR images were used to quantify WMH volume, which was in turn corrected for intracranial volume. FxA was assessed via caregiver interview using the Disability Assessment for Dementia (DAD). Zero-order and partial correlations adjusted for age and education were calculated between WMH and DAD total and subscale scores.

Results: Zero-order bivariate correlations yielded significant associations between WMH and DAD Total Score (r = -.443) as well as the Initiation (r = -.561) and Planning/Organization (r = -.416) subscales (ps all < .05). These associations remained significant upon adjusting for age and education (partial rs = -.385, -.526, and -.379, respectively). The relation between WMH and the DAD Effective Performance subscale was non-significant before and after demographic adjustment.

Conclusions: The present findings suggest the relation of WMH to cognition extends to everyday functioning in individuals at varying stages of decline, even when controlling for age and educational attainment. The observed correlation with initiation, planning, and organizational aspects of FxA is consistent with previous literature showing a relation between WMH and executive dysfunction. Future research would benefit from larger samples that permit mediation analyses to probe underlying mechanisms.
LEARNING NOT TO AVOID: PRELIMINARY DATA ON THE EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION ON LEARNING AND GENERALIZATION TO NOVEL CONTEXTS

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Background: Avoidance of anxiety-provoking situations plays a central role in the maintenance of anxiety and fear-based disorders, such as obsessive-compulsive disorder and posttraumatic stress disorder. Extinction of avoidance behaviors is essential for success of exposure-based psychotherapy, a first-line treatment for anxiety- and fear-based disorders. However, while initial fear acquisition and instrumental avoidance generalize easily across contexts, subsequent extinction of avoidance is context-bound and does not readily generalize to novel contexts. Rodent and human studies point towards the importance of the prefrontal cortex and hippocampus in extinction learning/memory and the modulation by context, respectively. Here we tested whether cathodal transcranial direct current stimulation (tDCS) during avoidance-based extinction learning can reduce the impact of contextual encoding to facilitate generalization of avoidance-based extinction across novel contexts using a reversal learning task in healthy volunteers.

Methods: Participants (N=15) completed a contextual reversal learning task with the goal to avoid losing points as much as possible. During the first phase (initial learning) participants saw two sets of images either presented in Context 1 (images A/B) or Context 2 (images C/D). Selecting images A and C resulted in losing points, on average, over stimulus B and D, which generally resulted in no points lost. After meeting a learning criterion participants started the reversal phase. During reversal, image pair A/B now appeared in a new Context (context dependent reversal condition), whereas image pair C/D continued to appear in the same Context (context independent reversal condition). Regardless of context, all contingencies reversed, i.e. images B and D resulted in points loss and images A and C resulted in no loss of points. Critically, participants received either 2 mA cathodal tDCS (n=7) or sham stimulation (n=8) targeting left dorsolateral prefrontal cortex (DLPFC) for 20 minutes starting at the beginning of reversal and continuing throughout. After meeting reversal criterion participants completed a test phase in which they saw previously presented stimuli pairs (A/B and C/D) in a novel Context. Participants were asked to select the image they preferred most and no accuracy feedback was provided in order to test generalization of previous learning and effects of tDCS on generalization of reversal learning.

Results: Preliminary analyses revealed a trend for tDCS group (active vs sham) on accuracy during reversal learning, F(1,13)=3.32, p=0.09; this was attributable to context dependent reversal, where participants in the active tDCS group made more errors (38.2%) than the sham group (26%), F(1,13)=5.35, p=0.04. There were no differences between groups in the total amount of points lost or the number of trials needed to reach criterion, p>0.05. Although non-significant, examination of preferred stimuli in the generalization Context 4 during the test phase showed that the sham group did not show a strong preference to any image, whereas participants who received active tDCS continued to avoid the image that resulted in loss of points during reversal and instead selected the image that resulted in a loss during initial learning (and did not result in points lost during the reversal phase).

Conclusions: Although these preliminary data should be approached with caution given the small number of participants, these observations suggest that cathodal tDCS to the DLPFC might facilitate generalization of learned stimulus-outcome contingencies during reversal to novel contexts. In doing so, tDCS might promote overriding of initially learned avoidance behavior and its generalization to novel contexts. If preliminary findings are supported further, this line of research may have the potential to improve exposure-based interventions by enhancing generalization of safety signals outside the treatment context.
Background and purpose: Increasing evidence supports the role of glucocorticoids and mineralocorticoid pathways in alcoholism. We previously reported that intravenous (IV) exogenous ghrelin increases alcohol craving in a cue-reactivity paradigm conducted in a double-blind placebo-controlled human laboratory study. This secondary study tested the hypothesis that IV ghrelin administration may increase endogenous serum cortisol and aldosterone levels.

Experimental Approach: Non-treatment-seeking, alcohol-dependent, heavy-drinkers (n = 37) were randomized to receive IV ghrelin or placebo, followed by a cue-reactivity procedure, during which participants were exposed to neutral (juice) and alcohol trial cues.

Key Results: There was a main effect for IV ghrelin administration, compared to placebo, in increasing serum cortisol concentrations [P = 0.01]. There was also a time effect [P < 0.0001] as well as a drug (IV ghrelin) x time interaction [P < 0.0001] in increasing serum cortisol concentrations. There was no main effect for IV ghrelin administration, compared to placebo, in increasing serum aldosterone levels [P > .05] or drug (IV ghrelin) x time interaction [P > .05], but there was a time effect [P = 0.001].

Conclusions and Implications: Our findings represent the first human evidence that exogenous IV ghrelin administration results in increasing of endogenous serum cortisol levels in a population of heavy drinking alcohol-dependent individuals. These results suggest a link between ghrelin signaling and the HPA axis which deserves further investigation.
Deep Brain Stimulation (DBS) is a widely-used therapy which has shown significant benefits to patients seeking treatment for symptoms of Parkinsonism and other movement disorders, and is used with a humanitarian device exemption for patients suffering from dystonia and obsessive compulsive disorder (OCD). Currently, DBS is “open-loop” in the sense that stimulation is delivered without reference to behavioral or brain states. Appropriately timed and patterned stimulation may produce unique benefits. Thus we tested the hypothesis that STN (subthalamic nucleus) DBS could selectively bias activity in the direct or indirect pathways of the basal ganglia with appropriately timed and spatially directed stimulation to create a "conditioned gaze preference" or "conditioned gaze aversion" in non-human primates.

We used a free viewing task, in which four circular images are shown in a 2x2 grid and the animal is allowed to freely viewing them for 5 sec. Positions of the pictures vary from trial-to-trial and a new set of pictures is used in each session. Whenever the animal looks at the picture designated as “stimulated”, then electronic stimulation is delivered in the subthalamic nucleus (STN) during the gaze duration only. Two different stimulation patterns were used - high : 130 hz and low : 20hz with [90us, 400us] pulse width and [0.3mA - 1mA] amplitude to modulate conditioned gaze preference. After the set time elapsed, a small amount of juice reward is delivered. For the precise location of DBS electrodes into the STN, we developed a novel surgical technique using a 3D printed surgical platform based on the animal’s CT and MRI data. Stimulation was alternated to examine whether a bias developed into that particular picture or not. Thus, the eye data from stimulated and unstimulated trials was analysed separately, in order to isolate any potential acute effects of the DBS, and so as to discern if a bias is being generated in the absence of stimulation. The "dwelling" gaze duration that the subject spent on each image was calculated from the eye data, and the number of initial glances that the monkey initiates towards each image. Preliminary results show that DBS of STN modulates conditioned gaze preference and aversion based on applied frequency.
LIVE-CELL MICROSCOPY AND FLUORESCENCE-BASED MEASUREMENT OF LUMINAL pH IN INTRACELLULAR ORGANELLES

Li Ma, PhD, Qing Ouyang, PhD, Gordon C. Werthmann, BS, Heather M. Thompson, PhD, and Eric M. Morrow, MD, PhD

Luminal pH is an important functional feature of intracellular organelles. Luminal pH changes such as endosomes, lysosomes, and the Golgi apparatus has been found related to many neurodevelopmental disorder (ie. Angelman Syndrome), genetic disorder (ie. Christianson Syndrome) and neurodegenerative disease (ie. Parkinson disease and Alzheimer disease). As such, accurate measurement of the luminal pH is of great importance. Here, we applied three powerful methods to measure rigorously the luminal pH of different intracellular organelles, focusing on endosomes (pH ~6.0—~6.5), lysosomes (pH ~4.5—~5.5), and the Golgi apparatus (cis- to trans-Golgi, pH ~6.7—~6.0).

Based on quantitative, ratiometric measurement of endocytosis of pH-sensitive and pH-insensitive fluorescent conjugates of transferrin, by confocal microscopy, we measured early endosome pH in HAP1 cells was 6.0 ± 0.1. Using flow cytometry/FACS-based ratiometric measurement of fluorescent conjugates of transferrin, the pH of early endosomes in HAP1 cells was determined as 6.57 ± 0.01. In contrast to the use of confocal microscopy as a means for analysis, discrete regions of interest cannot be selected when using FACS and little to no spatial or morphological information is obtained. While FACS has benefit for those cells that are of a semi-adherent or non-adherent nature.

The use of ratiometric pHluorin provides a genetically encoded means of monitoring intraorganellar pH. Because the pHluorin protein can be fused to the luminal domain of a protein of choice, this method allows for flexibility and specificity in the targeting of organelles for which one wishes to monitor intraorganellar pH. Trans-Golgi network (TGN) luminal pH in HAP1 cells was measured at 5.74 ± 0.04 by transfection with a plasmid encoding for TGN38-pHluorin and subsequently analysis using ratiometric fluorescence microscopy. Transmembrane domains 1–3 of Christianson Syndrome protein NHE6 fused to pHluorin2 (hNHE6-TM1–3-pHluorin2) was expressed in mouse primarily cultured hippocampal neurons and endosomal pH in these neurons was calculated at 6.82 ± 0.03 based on use of ratiometric pHluorin-tagged NHE6 and ratiometric fluorescence microscopy.

LysoSensor™ Yellow/Blue DND-160 provides a means for ratiometric measurement of intraorganellar pH through use of dual-wavelength fluorescence-based analysis. Microplate reader-based analyses of HAP1 cells loaded with LysoSensor™ Yellow/Blue DND-160 for specific amounts of time (1 min, 5 min, 20 min, 30 min, and 2 h), the average intraorganellar pH of all LysoSensor™ Yellow/Blue DND-160-labeled organelles combined was calculated at the following values for the respective time points: 4.97 ± 0.08 (1 min), 4.89 ± 0.08 (5 min), 5.40 ± 0.1 (20 min), 5.15 ± 0.04 (30 min), and 5.72 ± 0.02 (2 h). These results are suggestive of the alkalinizing effect LysoSensor™ Yellow/Blue DND-160 can have on intraorganellar pH over extended incubation periods. As such, experimental designs using relatively shorter treatment times (e.g., 1–5 min) are recommended.

Herein, we have described and provided examples of implementation of three methods for measuring the luminal pH of different intracellular organelles, focusing on endosomes, lysosomes, and the Golgi apparatus. These protocols are likely to be of benefit to many researchers, from basic scientists to those conducting translational research with a focus on diseases in patient-derived cells.
Stem cell biology has great potential for the study and treatment of neurodegenerative disease. More recently, the development of somatic cells i.e. fibroblasts or patient blood to derive induced pluripotent stem cells (iPSCs) has provided a new method to model disease, for example, human neurodegenerative conditions such as Parkinson’s disease and Alzheimer’s disease and human genetic disorder such as Christianzon syndrome and Down syndrome. The development of technologies to generate ESCs/ iPSCs raised the possibility of producing large numbers of defined classes of neurons for research and transplantation.

To better investigate Christianson syndrome, we need to induce cortical neuron from patient derived iPSCs and study the further potentially therapeutic studies. Here, we introduced the optimization of two differentiation protocols - dual SMAD inhibitor monolayer protocol and NGR protocol. ctl-iPSC (ASE-9203) line generated from normal human skin fibroblast using a non-integrating, footprint-free reprogramming method were used on this study.

For dual SMAD inhibitor monolayer protocol, in brief, Ctl-iPSC colonies were treated with Gentle Cell Dissociation Reagent and plated onto Neural Maintenance Media (NMM) then followed by 10-12 days of NMM +1 μM Dorsomorphin +10 μM SB431542 feeding. After which cells were passaged from 12 well plate to 6 well plate and fed with NMM. 4 days of feeding with NMM + fibroblast growth factor 2 (FGF2) was then to promote the formation of neuronal rosettes. On day 22, confocal microscopy images from immunohistochemistry showed neuronal rosettes were stained with Sox2, the marker for primary progenitor cells. Differentiated neuron were then stained with MAP2 (Neuronal specific protein), and Tbr1 (deeper layer neuron) on day 46. On day 76, induced cortical neurons were successfully stained with pre-synaptic marker Synapsin- I. Compared to iPSCs, the protein level of Synapsin- I, SV2 (pre-synaptic marker) and PSD95 (post-synaptic marker) harvested from induced cortical neuron culture on day 119 showed 11.1, 2.3 and 1.7 folder increasing respectively.

When it refers to NGR protocol, optimal puromycin concentration (1ug/ml) forctl- iPSCs line was screened by dose treatment experiment. These iPSCs culturing in mTesR medium were transduced with three lentiviruses-neurogenin-2 (Ngn2, for rapid conversion from iPSCs into neuronal cells, with puromycin resistance), GFP and reverse tetracycline-controlled transactivator (rtTA) for 24 hrs and then splitted and fed with mTesR media for 7 days to generate NGR lines which was used for next step cortical neuron induction. On iN D2, in KSR media, Doxycyclin was added to induce TetO gene expression and then on iN D3, puromycin selection started. Starting from iN D4, N2B+B27 were added to induce the neuron and neurotrophic factors BDNF, CNTF, GDNF were added to NBM+B27 media to promote the induction of neuron till iN D26. As early as iN D5, some neuron branches started to show. On iN D26, confocal microscopy images from immunohistochemistry showed induced cortical neuron colocalized with MAP2 and Synapsin- I, further detection of Synapsin- I protein by western blotting showed the expression of pre-synaptic marker.

In summary, these iPSCs were induced rapidly and effectively to excitatory cortical neurons by above mentioned two differentiation protocols. Compared to dual SMAD inhibitor monolayer protocol, NGR protocol showed more effective and generated a homogeneous population of iN cells based on its puromycin selection and GFP marker. While the GFP fluorescence in NGR protocol limited the staining marker in immunohistochemistry to two vs. three in dual SMAD inhibitor monolayer protocol.
Objective: Childhood maltreatment is a major risk factor for the development of behavioral problems and poor physical and mental health. Accelerated cellular aging, through reduced telomere length and mitochondrial dysfunction, may be a mechanism underlying these associations. Methods: Families with (n=132) and without (n=123) child welfare documentation of moderate-severe maltreatment in the past six months participated in this study. Children ranged in age from 3 to 5 years, were racially and ethnically diverse, and 91% qualified for public assistance. Structured record review and interviews were used to assess a history of maltreatment and other adversities. Telomere length and mitochondrial DNA copy number (mtDNAcn) were measured from saliva DNA using real-time PCR. Measures were repeated at a six-month follow-up assessment. Repeated measures general linear models were used to examine the effects of maltreatment and other adversities on telomere length and mtDNAcn over time.

Results: Maltreatment and other adverse experiences were significant positive predictors of both telomere length and mtDNAcn. Internalizing and externalizing behavior problems were also both significantly associated with telomere length, but only internalizing symptoms were associated with mtDNAcn. Conclusions: This is the first study to show that mtDNAcn is altered in children with stress and trauma, and the findings are consistent with recent studies of adults. Surprisingly, children who experienced moderate-severe levels of maltreatment in the prior six months had longer telomeres, possibly reflecting compensatory changes in response to recent trauma. Telomere length and mtDNAcn were also associated with behavioral problems, suggesting that these measures of cellular aging may be causally implicated in the pathophysiology of stress-related conditions.

Keywords: early life stress, maltreatment, adversity, behavior problems, mitochondria, telomere
COGNITIVE DECLINE PREDICTS PERCEIVED LONELINESS IN NON-DEMENTED OLDER ADULTS AT RISK OF ALZHEIMER’S DISEASE

Seth Margolis, PhD, Bryant Duda, Gretchen O. Reynolds, Charles Denby, Khrystyne A. Poll, Meghan Gilmore, Geoffrey Tremont, Brian R. Ott

Loneliness may be an early consequence of cognitive decline in older adults. Yet, the extent to which subtle cognitive change is linked to feelings of social disconnectedness remains understudied. To date, no research has specifically addressed this topic in an Alzheimer’s disease (AD) prevention registry. This longitudinal study examined whether decline in cognitive screening test performance is related to greater loneliness in non-demented older adults drawn from the Rhode Island Alzheimer Prevention Registry.

Participants (n=63; 78% female; age=65±8 years) were at increased risk of AD (75% had family history of AD; 19/41 [46%] APOE-tested participants were ε4+). Perceived loneliness was rated at the most recent follow-up (Three Item Loneliness Scale; α=.78; higher values reflect more loneliness) and regressed on a Minnesota Cognitive Acuity Screen (MCAS) change score (i.e., baseline Total Score – most recent Total Score), controlling for age and time between assessments. Mean time to follow-up was 3.8±1 years (range=1-5 years).

All baseline MCAS Total Scores were in the non-impaired range, whereas 6% declined to the mild cognitive impairment (MCI) range by most recent follow-up. A quarter of participants (25%) displayed cognitive decline (MCAS change score>0) and a third reported some degree of loneliness (34%) by follow-up. Regression analysis (R2=.11, p=.03) showed that MCAS decline (β=.29, p=.03) predicted more loneliness independent of age (β=.14, p=.26) and time between assessments (β=.10, p=.42).

This longitudinal study found that subtle declines in cognition predicted greater perceived loneliness in non-demented individuals at risk of AD. As baseline ratings of loneliness were not collected, future studies should test whether cognitive decline leads to increases in loneliness over time, and if individuals at heightened risk of AD reporting more loneliness convert to MCI and dementia at faster rates.
SEDATIVE/ANTICHOLINERGIC DRUG BURDEN PREDICTS WORSE MEMORY ACQUISITION IN RACIALLY/ETHNICALLY DIVERSE OLDER ADULTS WITH TYPE 2 DIABETES

Seth Margolis, PhD, Malka Zugaft Sears, Carly Solon, Lori A. Daiello, Luba Nakhutina, Claire Hoogendoorn, Jeffrey S. Gonzalez

Sedative/anticholinergic drug use, measured by the Drug Burden Index (DBI), has been linked to cognitive impairment in older adults. Yet, studies on the association of DBI and neuropsychological domains are lacking, especially in underserved groups at risk of cognitive deficit. We elucidated cross-sectional relationships between the DBI and the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) in a diverse type 2 diabetes sample. Based on results of a prior study, we anticipated that higher DBIs would negatively affect memory at older ages.

Participants were 105 adults with type 2 diabetes (age=57±9 years, 65% female, 65% African American, 28% Hispanic/Latino, HbA1c=7.8±1.8). As the DBI was positively skewed, Spearman correlations assessed its bivariate relationships with RBANS Index scores. Adjusting for comorbid illnesses, glucose control (HbA1c), and education, OLS regression tested the moderating effect of age on significantly associated DBI-RBANS relationships at mean±1 standard deviations of age. Non-parametric bootstrap confidence intervals were run based on 10,000 draws with replacement.

One third of participants (34%) endorsed current sedative/anticholinergic use. Mean DBI was 0.42±0.81 (range=0.00-4.27). RBANS Index scores ranged from mildly impaired to average. DBI scores were negatively correlated with Immediate Memory (rs=-.24, p=.013) but no other RBANS Indices (p's≥.148). There was a significant DBI*Age interaction (b=-.68, 95%CI=-1.28,-.82, p=.026); the negative effect of DBI on Immediate Memory was only significant for those ≥57-years-old.

Sedative/anticholinergic drug use was prevalent in these diverse adults with type 2 diabetes. Adjusting for a priori covariates, greater drug burden was associated with worse memory acquisition but only among older adults. Prospective studies are needed to determine whether memory acquisition improves with medically appropriate de-prescribing of sedating and anticholinergic medications. Studies should also assess how the presence of other cognitive risk factors common in diabetes (e.g., hyper and hypoglycemia, cerebrovascular disease, inflammation) and dementia biomarkers effect this interaction.
SERIAL NEUROPSYCHOLOGICAL ASSESSMENT OF AN ADULT WITH MOYAMOYA DISEASE AND BORDERLINE PERSONALITY DISORDER

Seth Margolis, PhD, Andrea Sartori

Moyamoya disease (MMD) is a rare cerebrovascular condition, which predisposes people to hypoperfusion, TIA, and stroke. Frontal-subcortical cognitive deficits are common but the rate of neuropsychiatric sequelae is unclear. Case studies have described acute onset mania and psychosis precipitating MMD diagnosis in children/adolescents; however, comorbid personality disorders have not been documented.

We describe a 27-year-old, right-handed, female of mixed race with angiogram-confirmed MMD. Her history includes labile moods and impulsivity since childhood, and polysubstance abuse/prostitution in adulthood. Inpatient neuropsychological evaluations were conducted during two hospitalizations: following a right MCA ischemic stroke involving frontal, temporal, and parietal areas, and then 3-months later following left hemisphere punctate infarcts.

Initially, she had left-sided facial droop/foot drag and right gaze preference. Speech was pressured, dysarthric and profane. Thought process was tangential. Affect was labile and interpersonal boundaries were loose. Neuropsychological testing revealed severely impaired attention and marked visuospatial/constructional deficits with pronounced left-sided neglect. Language and verbal learning/memory storage were grossly intact but with variable delayed verbal recall. Insight and judgment/decision-making were poor. At follow-up, basic attention, neglect, and insight improved. Visuospatial, memory recall, and mood/lability issues persisted. Executive dysfunction was now apparent. She did not demonstrate aphasia.

This patient’s initial presentation and persisting deficits represent classic neuropsychological sequelae of right MCA infarction. However, it is difficult to disentangle whether her borderline personality traits developed independently of MMD, were mediated by chronic hypoperfusion, or represent a neuropsychiatric prodrome of MMD induced strokes. Regardless, these behavioral abnormalities were exacerbated by stroke and further impaired her overall functioning.
Background. “Pain” has sensory and affective (emotional) components. Chronic low back pain’s (CLBP’s) affective symptoms are significant drivers of disability and psychiatric comorbidity. However, treatments specifically directed at these symptoms (e.g. pain-focused cognitive behavioral therapy) are limited; consequently, there is over-reliance on opioid analgesics with deleterious side effects. Our prior work suggests that tDCS may noninvasively modulate pain-related affective distress. We present full analysis of a first multi-site, double-blinded, placebo-controlled RCT of multiple sessions of transcranial direct current stimulation (tDCS) targeting left dorsal anterior cingulate cortex—a region implicated in pain’s affective component—in CLBP patients. We hypothesized that this approach would selectively reduce pain-related distress symptoms over the course of the tDCS sessions and at a six-week follow-up.

Methods. We consented 30 participants with CLBP of at least 6 months’ duration, pain intensity of at least 4 out of 10 on the Defense and Veterans Pain Rating Scale (DVPRS), and at least one trial of physician-recommended medication. Twenty-one participants completed the study. Carbon-rubber electrodes within 5x7 cm saline-saturated sponges were placed over FC1 (10-20 EEG coordinates) and over the contralateral mastoid (return electrode). We adapted this empirically-based montage from our prior work, verifying it with post-hoc electric field modeling. Participants received 10 daily sessions of sham or active tDCS (20 minutes/session, 2mA, cathodal polarity relative to return electrode) and rated pain-related intensity (DVPRS), acceptance (CPAQ-8), interference (WHYMPI General Activity Subscale), disability (RMDQ), and anxiety (PASS-20), as well as general depression (PHQ-9), general anxiety (GAD-7), treatment expectations (CEQ), and treatment satisfaction (CSQ-8). Sham tDCS briefly ramps the electric current up and then down in order to reproduce transient sensations (e.g. skin tingling) associated with active tDCS to enhance blinding.

Results. A regression analysis following an intention-to-treat approach noted significantly improved WHY-MPI-C (p=0.002), RMDQ (p=0.001), and PHQ-9 (p=0.003) scores at 6-week follow up with active vs. sham tDCS. CEQ scores were significantly increased at Day 10 (p=0.038) with active vs. sham tDCS. Post-hoc tests also noted significant main effects of active vs. sham tDCS on WHY-MPI-C (p=0.037) and RMDQ (p=0.028) when Day 1 baseline scores were excluded. Participants prescribed opioids significantly differed from non-opioid participants only by having lower Day 1 CPAQ-8 (p<0.001).

Conclusions. To the authors' knowledge, this is the first double-blinded, placebo-controlled RCT of multiple tDCS sessions targeting left dACC in an attempt to modulate the affective component of CLBP. Participants who received active tDCS showed improvements in pain disability and depression. Future replication studies would benefit from larger sample sizes to increase power.
DISRUPTIVE MOOD DYSREGULATION DISORDER: ENHANCING OBJECTIVE ASSESSMENTS IN VERY YOUNG CHILDREN

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Objectives: Chronic irritability and temper outbursts are characteristic of several psychiatric illnesses, including disruptive mood dysregulation disorder (DMDD). This relatively new disorder is characterized by a minimum of three weekly temper outbursts, irritable/angry mood for most of the day nearly every day for at least 12 months, and an onset criterion of at least 6 years. Several studies, however, have found that DMDD can be identified in children under the age of 6. Research on DMDD in very young children has been hampered by the limited availability of measures of irritability in this age group. The current study examines the feasibility and preliminary validity of a brief measure of irritability for use with very young children that was originally developed for older children and adolescents.

Methods: 21 participants (14 male; 7 female) between the ages of 36 months to 88 months (M = 67.6, SD = 13.04) who presented to a partial hospital treatment program for children with serious emotional, behavioral, feeding, sleeping or relationship problems. Parents completed the Child Behavior Checklist for Ages 1.5 to 5 (CBCL) at the time of admission. The Affective Reactivity Index (ARI) was administered to parents and program milieu therapists on admission, weekly, and at discharge.

Results: 17 parents completed the ARI at program admission. Internal consistency was good. In addition, the ARI (parent-report) was associated in the expected direction with the Emotional Reactivity subscale of the CBCL, r (8) = .72, p < .05, providing preliminary evidence for convergent validity. With respect to cross-informant agreement, parent- and staff-reports were not significantly correlated, with r values ranging from -0.46 to 0.53 (all p values = ns). On average, parents reported their children to be moderately to severely irritable upon program admission (M = 1.31, SD = .42) and throughout their program participation.

Conclusions: The ARI demonstrated feasibility and significantly correlated with the Emotional Reactivity subscale of the CBCL. This demonstrates its potential to successfully measure irritability in this younger age group. Differences between informant ratings highlight the impact of setting and informant perspective on interpretation of behavior/mood. Consistent ratings of moderate to severe irritability over time highlight the ARI's potential for measuring whether young children meet DMDD criteria.
THE RISE OF RETAIL HEALTH CLINICS: OPPORTUNITIES FOR BEHAVIORAL HEALTH INTEGRATION

Stephen Matsko, MA, James O. Prochaska, PhD

Background:
Retail health clinics (RHC) are a relatively new addition to the U.S. healthcare system and still very much in the early stages of development. They are generally located in retail settings including pharmacies, grocery stores, and discount chains. The vast majority of RHCs are owned by companies with a traditional focus in retail or pharmacy with only 11% owned by existing hospital chains or physician groups as of 2012.

Scope of Treatment:
RHCs focus on a limited number of common acute conditions. These conditions generally have widely accepted treatment guidelines and generally do require follow-up appointments making them ideal for treatment in these settings. Indeed, 95% of all presented cases fall into categories of upper respiratory infections, Sinusitis, Bronchitis, sore throat, immunizations, inner ear infections, swimmer's ear, conjunctivitis, and urinary tract infections. While the scope of retail clinics has been limited to date, there are efforts currently underway to expand into the areas of chronic care management, public health related interventions, and leveraging telemedicine interventions.

Benefits:
Cost: RHC have generally been able to offer cost savings over traditional providers largely because of less expensive staffing models. Average savings have been estimated to be approximately $50-55 per episode and some research suggests that an estimated 13-27% of all ER visits could be handled in retail clinics resulting in a potential savings of $4.4 billion dollars annually.
Assess: Convenience has consistently proven to be a positive driving factor in the success of RHCs. They generally offer evening hours on weekdays and access throughout weekends, which many physician offices do not. Their locations in large retail settings also provide free, accessible parking in areas that patients already frequently travel to and from.
Quality of Care: Despite offering lower costs through less expensive staffing models, the quality of care received continues to get marks similar to traditional care in physician offices, urgent care, and emergency departments.

Current Study:
This study aimed to collect information about RHC utilization to investigate differences between utilizers and non-utilizers as well as to explore the acceptability of behavioral health integration in these settings. We recruited a sample from areas with a saturation of retail health clinics (n=551) and assessed for Stage of Change related to retail clinic utilization: 24.3% Pre-contemplation, 14.2% Contemplation, 20.3% Preparation, 5.8% Action, and 35.3% Maintenance. Participants who have used a RHC were younger in Age, had higher incomes, higher levels of Education, lower BMI, and scored higher on Mental Health screening assessments. Rates of chronic disease were also noted: hypertension (32.7%), anxiety or depression (29.5%), hyperlipidemia (26.3%), arthritis (24.2%), Respiratory issues (14.2%), diabetes (12.6%), cardiac issues (10.2%), and cancer (7.6%). Overall, 83% of utilizers were satisfied with their experience at a RHC with only 2% reporting that they were unsatisfied. Utilizers also answered that they would be extremely or somewhat likely to seek Health Behavior Change help at a RHC (39%), Mental Health Screening (33.8%), and Mental Health Treatment (33.2%).

Conclusions:
Retail Health Clinics are a growing trend in both acute care and chronic disease management, shifting some of this market share away from primary care, urgent care, and emergency departments. This study adds to the limited data on who is using retail health clinics and is believed to be the first to explore the consumer opinions on integrating behavioral/mental health into these settings. Findings suggest that there is a need for these services in these settings and that consumers may be open to behavioral health interventions delivered at RHCs.
Behavioral economic (BE) research has demonstrated that increasing the salience of delayed substance-free rewards can increase individuals’ capacity for delaying gratification and allocating behavior towards larger, delayed rewards rather than smaller more immediate reward such as alcohol use. This study aimed to improve the efficacy of outpatient alcohol use disorder (AUD) treatment by adding elements that directly target behavioral economic mechanisms of change. The study hypothesized that the Substance-free Activity Session (SFAS) intervention will reduce alcohol use, AUD symptoms, relative reinforcement from alcohol use, and increase substance-free reinforcement compared to an active control at 3-month follow-up.

Participants were 41 adults engaged in treatments at various community based outpatient treatment facilities. Following baseline assessment, participants were randomized to either an individual single-session intervention that focused on increasing engagement in substance-free activities and future orientation (SFAS) or to an individual sleep and nutrition education control condition. Both groups received four weekly text-message reminders of the contents of the session. Study participants (68.3% male; 70.7% Caucasian, M age = 38.75, SD = 13.56) reported 27.44 (SD = 14.25) binge drinking episodes in the past 90-days, 9.31 (SD = 6.62) drinks per drinking day, and 7.39 (SD = 2.61) AUD symptoms at baseline.

A series of regression models (negative binomial hurdle and linear regression) that controlled for treatment condition and baseline levels of the outcome as covariates indicated that the SFAS group reported fewer binge drinking episodes and reduced proportionate substance-related (relative to substance-free) reinforcement compared to controls. Results did not indicate treatment group differences in number of drinks consumed per drinking day or AUD symptoms.

These preliminary results suggest that the SFAS has the potential to improve some clinical outcomes for adults enrolled in outpatient AUD treatment. Our findings demonstrate that patients assigned to the SFAS reduced number of heavy drinking episodes and reduce relative reinforcement from substance-related activities.
FRONTAL LOBE FUNCTIONING IN OBSESSIVE-COMPULSIVE DISORDER WITH AND WITHOUT HOARDING SYMPTOMS

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Background: Many studies demonstrate frontal-subcortical deficits in OCD, though there is variability depending on the assessed construct as well as the clinical sample. Some literature suggests comorbid conditions may play a role in the relationship between OCD and the degree of impairment in executive functioning in OCD. Hoarding Disorder, while previously viewed mainly as a form of OCD, is now characterized as a separate DSM-5 condition. Impairment along several cognitive dimensions, particularly with regards to prefrontal cortex function, has been reported in hoarding. Here, we tested frontal lobe functioning in OCD participants with (OCD+H) and without (OCD-H) compulsive hoarding using the Frontal Systems Behavior Scale (FrSBe), a widely-used self-report measure.

Methods: Data were collected in a randomized controlled trial of aerobic exercise in OCD. Participants with OCD (n=56) were individually matched to healthy participants using age, gender, and years of education. OCD symptom severity (Yale-Brown Obsessive Compulsive Scale; YBOCS), presence of hoarding symptoms (YBOCS-Symptom Checklist), and frontal lobe function (FrSBe) were assessed at study baseline. Given a significant between-groups difference on the YBOCS (OCD+H exhibited higher YBOCS severity), analyses covaried for YBOCS severity.

Results: Multivariate analysis of variance revealed a significant difference between OCD participants and controls in FrSBe total and subscores (all p < .001), with the highest frontal functioning deficits found in OCD+H and the lowest in HC. Follow-up analyses were conducted to examine differences between the OCD+H (n=24) and the OCD-H (n=31) subgroups. Analyses of covariance showed significant between-groups differences in FrSBe total scores and subscores between OCD+H and OCD-H (total: p <.001, apathy: p = .002, disinhibition: p = .012, executive dysfunction: p < .001), with OCD+H exhibiting greater impairment in all areas.

Conclusion: These results indicate that hoarding in OCD patients is associated with more dysfunction in constructs related to frontal systems function. Future studies that investigate the relationship between hoarding disorder, OCD, and additional prefrontal domains (particularly on more specific experimental measures) would serve to help determine if interventions targeting hoarding symptoms would reduce impairments in frontal lobe functioning, or, conversely, if interventions to improve frontal functioning would improve hoarding symptoms.
We have three aims: Innovation, Dissemination, and Education. Under Innovation, we are developing new bioluminescent tools for imaging and controlling dynamic activity in the brain. Manipulation is achieved with cellular specificity by coupling BioLuminescent drivers to OptoGenetic sensors (‘BL-OG’), a strategy already shown to be an effective chemogenetic modulator. A key focus of our new developments in imaging and modulation is on the use of bioluminescent calcium sensing.

These new advances will be Disseminated broadly and openly with other scientists, what we refer to as ‘horizontal’ Open Science. We will distribute molecular tools and protocols, host workshops to demonstrate hands-on laboratory techniques, and send emissaries from our groups to the labs of interested scientists to facilitate method adoption. Critical to dissemination, we will develop a website for users to access unpublished data and obtain materials, browse a comprehensive library of all bioluminescent molecules identified and used in research, learn about the history of bioluminescence research and the biology of organisms with natural bioluminescence, access information and updates about our events, provide input and ask questions, and suggest workshop themes.

We will practice ‘vertical’ Open Science primarily by Educating at the grade school, high school and undergraduate levels. We will develop, present and distribute curricula that are accessible, engaging, and informative. Annually, we will host a week long, lab-intensive, immersive workshop on bioluminescence for undergraduates at the Marine Biological Laboratory. The new course is open to students from across the country, and our inaugural workshop in 2018 includes enrollment from ten different colleges in seven states.
The development of optogenetics has fostered significant progress in neuroscience by enabling high spatio-temporal control of genetically identified cell populations. Optogenetics is an appealing tool for dissecting neural circuits, and controlling dysfunctional cell ensembles underlying pathological disorders. However, there are several barriers that limit the use of optogenetics in-vivo. In particular, invasive devices used for light delivery (e.g., optical fibers) can be perilous because implants represent a potential path for pathogens to reach the brain. To partly meet these needs, we devised the BioLuminescence-OptoGenetics (BL-OG) method, which leverages bioluminescence (BL) to activate optogenetic elements. In our BL-OG construct, the slow-burn Gaussia luciferase (sbGLuc) is tethered to Volvox-Channelrhodopsin1 (VCHR1), and BL is generated when Coelenterazine (CTZ) is catalyzed by sbGLuc. Here, we assayed whether BL-OG can be used as a gain modulator by studying whether increases in BL lead to corresponding changes in neural firing. We injected the sbGLuc+VCHR1 construct in mice primary somatosensory cortex (SI), and performed simultaneous BL imaging and electrophysiological recordings while stimulating animals’ whiskers prior to and after CTZ injections. Our data revealed a positive relationship between BL and neural firing, and that BL-OG enhanced stimulus-evoked activity of SI neurons. These data indicate that BL-OG systematically regulates cells’ activity in-vivo.
RESPONSE INHIBITION AND OBSESSIVE COMPULSIVE SYMPTOMATOLOGY IN A NON-CLINICAL SAMPLE

Sarah Morris, MA; Martin Franklin, PhD; Han Joo Lee, PhD

Deficits in response inhibition (RI), the ability to suppress inappropriate or irrelevant responses, may play a role in the etiology and/or maintenance of obsessive-compulsive disorder (OCD). Many studies have demonstrated differences in RI between OCD patient groups and control groups, leading researchers to posit that deficient RI may be an endophenotype of OCD. Based on the current conceptualization of endophenotypes in psychiatric disorders, such markers should vary across the general population. Little research on RI and obsessive-compulsive (OC) symptomatology has been conducted in non-clinical samples, making this criterion difficult to evaluate. Additionally, some studies have failed to find deficits in RI performance in individuals with OCD. A likely explanation for inconsistent findings may be that most studies to date have relied on single measures of RI. RI is composed of multiple domains, which may be differentially related to OCD symptoms. In the current study, we examine associations between multiple domains of RI and OC symptomatology in a non-clinical sample. Two hundred and twenty-two undergraduates came into the lab to complete three separate RI tasks, the motor Stroop task, the go/no-go task, and the stop signal task. Participants also completed self-report questionnaires measuring symptoms of OCD, attention deficit/hyperactivity disorder, behavioral impulsivity, depression, and anxiety. Multiple linear regressions demonstrated that after controlling for symptoms of ADHD, impulsivity, depression, and anxiety, symptoms of OCD significantly predicted action cancellation, the RI domain captured in the stop signal task. This finding provides support for existence of a unique relationship between OC symptomatology and RI, in an analogue population. OCD symptoms were unrelated to interference control and action restraint, RI domains measured with the motor Stroop and go/no-go tasks, respectively, suggesting that individual domains of RI are not uniformly related to OCD.
EVALUATION OF IMPROVEMENTS IN PSYCHOSOCIAL FUNCTIONING IN A CHILD HOSPITAL SETTING

Katharine Musella, BA, Teresa M. Preddy, PhD, Anne S. Walters, PhD, Stephanie H. Parade, PhD, Jeffrey I. Hunt, MD

The purpose of the current study is to provide preliminary evidence for the effectiveness of a child partial hospital program in treating and improving child psychosocial and family functioning. An additional aim is to examine the utility of the Pediatric Quality of Life Inventory (PedsQL) in evaluating treatment outcome. A majority of youth in our sample were male (68%) with a mean age of 10. For the current study, clinical outcomes research was implemented into admission and discharge procedures in a child partial hospital setting for children ages 7-12. Survey data was collected via a data capture system, RedCap, through self-reporting by an Ipad system or paper copy. Parents completed the parent report of the PedsQL 4.0 (PedsQL; Varni, 1999) and PedsQL Family Impact Module 2.0 and children completed the PedsQL child report. Paired samples t-tests indicated that child reports suggested significant improvements in Social Functioning \( t(32) = -4.85, p < .001 \) and Emotional Functioning \( t(33) = -6.28, p < .001 \). Additionally, parent reports also suggested improvements in Social Functioning \( t(32) = -4.98, p < .001 \) and Emotional Functioning \( t(32) = -5.87, p < .001 \). Parents reported significant improvements in family functioning including Daily Activities \( t(30) = -0.79, p < .007 \) and Family Relationships \( t(32) = -7.52, p < 0.001 \). Results demonstrate preliminary evidence that children and families participating in a child partial hospital program report significant improvements in multiple aspects of psychosocial functioning including child social functioning, emotional functioning, school functioning, physical functioning, family daily activities, and family relationships upon discharge. Data collection for the PedsQL is ongoing and in most recent analyses (n=95) results were consistent with these preliminary results: Parent reports of child functioning suggested significant improvements in Physical Functioning, Emotional Functioning, Social Functioning, School Functioning, Psychosocial Health, and Total Quality of Life. Additionally, parents showed significant improvements in Physical Functioning, Emotional Functioning, Social Functioning, Communication, Worry, Daily Activities, Family Relationships, Parent Functioning Total, Family Functioning Total, and Total Quality of Life. Child reports suggested significant improvements in Physical Functioning, Emotional Functioning, Social Functioning, School Functioning, Psychosocial Functioning, and Total Quality of Life. We are currently working to establish norms for this clinical population. This will allow for a comparison to norms with children presenting with medical and comorbid psychiatric problems. This study yields support for embedding an assessment of clinical outcomes in a treatment service, as well as for efficacy of treatment for psychiatric problems from both child and parent perspectives.
PERIPHERAL EFFECTS OF INTER-ALPHA INHIBITOR PROTEINS ON WHITE BLOOD CELL COMPOSITION AND BLEEDING TIME AFTER HYPOXIC-ISCHEMIC BRAIN INJURY IN NEONATAL RATS

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Background: Inter-alpha inhibitor proteins (IAIPs) are immunomodulatory molecules that exert neuroprotective effects in hypoxic-ischemic (HI) brain injury. IAIPs reduce apoptosis, microglial proliferation and neutrophilic brain infiltration after HI in neonatal male, but not female rats. The IAIP light chain (bikunin) inhibits proteases of the blood coagulation system, including factor Xa and kallikrein. It is therefore critical to establish the safety of IAIPs on coagulation before considering their usage in human neonates. However, the effects of IAIPs on hematological variables and bleeding time have not been determined at this time.

Objective: To determine the effects of IAIPs on complete blood count (CBC) and bleeding time in male and female neonatal rats after exposure to HI brain injury.

Design/Methods: Postnatal day 7 rats were assigned to 3 groups: Sham-control (Sham) or carotid ligation and hypoxia (8% oxygen for 90 min) treated with placebo (PL-HI) or IAIP (IAIP-HI). IAIP (30 mg/kg) or PL was given intraperitoneally at 0, 24 and 48 h after HI. Rat sex was recorded. Number/group/sex was 8–21. CBCs were analyzed on a Siemens Advia Analyzer on blood collected 72 h after HI to quantify total white blood cells (WBCs), percentage of neutrophils and lymphocytes, and platelet number. Bleeding time studies were similar except that IAIP (60 mg/kg) was given at the same time points after HI. Bleeding time was determined by cutting the distal 0.1 cm of the tail on anesthetized rats, and quantifying the duration of bleeding (min) without knowledge of the group.

Results: The total number of WBCs in the PL-HI and IAIP-HI groups did not differ (P>0.05) from the Sham group (male: 3.6±1.10; female: 3.5±1.12 10³/μL, m±SD). The percentage of neutrophils increased after HI (PL-HI) but not after IAIP treatment in the IAIP-HI group (ANOVA, F(2,34)=6.92, P<0.05), and the percentage of lymphocytes decreased after HI in PL-HI but not after IAIPs in the IAIP-HI group (ANOVA, F(2,34)=7.04, P<0.05) in male, but not in female (P>0.05) neonatal rats. The total number of platelets (P>0.05) and bleeding times (P>0.05) did not differ among the groups in the male or female rats.

Conclusion: Treatment with IAIPs attenuates HI-associated increases in the percentage of neutrophils, and attenuates HI-associated decreases in the percentage of lymphocytes in male but not female rats. Even though IAIPs are serine protease inhibitors, treatment with IAIPs does not affect platelet count or bleeding time after HI, suggesting that treatment with IAIPs does not exert adverse effects on these components of the blood coagulation system.
The unprecedented growth of technology use in recent years has provided a new context for adolescents' intimate relationships. As youth engage in romantic relationships for the first time, they increasingly use text messages and social networking sites as their primary means of communication (Lenhart et al., 2010). Although romantic relationships provide a critical context for the development of adolescents' interpersonal skills (e.g., Collins & Steinberg, 2006), little is known regarding how technology-based communication may affect this process. Technological communication may be less "rich" than traditional forms, such as in-person and voice-based phone interactions, that may provide more immediate feedback, a higher number of interpersonal cues (tone, volume, voice inflection), and greater variety in language expressed (Daft & Lengel, 1986). If technology-based communication is replacing traditional communication for some adolescents, and it lacks the "richness" necessary for practicing complex romantic relationship interactions, higher proportions of technology-mediated communication may have adverse consequences for interpersonal skill development.

The current study tested this hypothesis using a one-year, longitudinal cross-lagged design within a SEM framework. Participants were from a school-based sample of 487 adolescents (58% girls; 52% non-white, ages 13 to 16) who reported having a "dating partner" at both time points. A measure was designed to assess adolescents' average proportions of communication with romantic partners using technology-based versus traditional means (1="I communicate with my romantic partner mostly in person/on phone calls"; 5="About half in person/phone calls and half using technology"; 9="I communicate with my romantic partner mostly using technology. We rarely communicate in person/on phone calls"). Additionally, the interpersonal competencies of negative assertion and conflict management were assessed using the Interpersonal Competence Questionnaire (ICQ; Burhmester et al., 1988; alphas>.83). Latent variables were created for each of these competencies using item parcels.

Results indicated that roughly one third of participants (32.8%) reported that the majority of their communication with dating partners occurred via technology; another third (32.3%) reported using primarily in-person or phone-based communication; and the remaining third (34.9%) reported communicating with dating partners equally through technology-based and traditional forms of communication.

Cross-lagged lagged panel models indicated that a model with autoregressive effects and estimated paths from Time 1 proportions of technology-based communication to Time 2 negative assertion and conflict management was the optimally fitting and most parsimonious model \[\chi^2(62)=91.8; p=.008; \text{CFI}=.99; \text{TLI}=.99\]. Paths estimating the opposite direction of effects were non-significant. Moderation by gender was tested using a multiple group SEM. Ultimately, results suggested that higher proportions of technology-based communication with romantic partners at Time 1 was associated significantly with lower negative assertion skills at Time 2 for all adolescents, after controlling for Time 1 skills (b=−.07, p<.01). Higher Time 1 proportions of technology-based communication also was associated with lower Time 2 conflict management for boys only (b=−.11, p<.01).

Overall, adolescents' greater proportion of technology-based communication with romantic partners may have negative implications for the development of interpersonal competencies, perhaps especially among boys, for whom romantic relationships may provide a unique context for learning these skills.
HUMAN NEOCORTICAL NEUROSOLVER: A NEW TOOL FOR CELLULAR AND CIRCUIT LEVEL INTERPRETATION OF MEG/EEG AND ECoG SIGNALS

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MEG/EEG are the leading methods to non-invasively record human neural dynamics with millisecond temporal resolution. However, it is extremely difficult to infer the underlying cellular and circuit level origins of these macro-scale signals without simultaneous invasive recordings. This limits the translation of MEG/EEG or ECoG findings into novel principles of information processing, or into new treatment modalities for neural pathologies. As such, there is a pressing need, and a unique opportunity, to relate the macro-scale signals to their underlying meso-scale generators.

To address this need, we are developing the Human Neocortical Neurosolver (HNN), an open-source neural modeling tool designed to help researchers and clinicians interpret human imaging data. HNN presents a convenient graphical user interface to an anatomically and biophysically detailed model of human thalamocortical brain circuits, making it easier to generate and evaluate hypotheses of the mechanistic origin of measured signals without formal computational neural modeling or coding experience. A unique feature of HNN’s model is that it accounts for the biophysics generating the primary electric currents underlying such data, so simulation results are directly comparable to source localized data (nano-Ampere-meters). This enables precise tuning of model parameters (e.g. timing/strength/location of thalamic inputs, features of circuit architecture) to allow the model to match characteristics of recorded signals. We are integrating the circuit-level modeling with the minimum-norm-estimate (MNE) source localization software so researchers can compute MEG/EEG source estimates and test hypotheses on the circuit origin of their data in one software package.

Here, we describe initial application of HNN to several test case examples aimed at studying the circuit-level origin of some of the most commonly measured MEG/EEG signals, including event related potentials and low frequency rhythms (alpha/beta/gamma) in primary somatosensory, visual and auditory cortex. We also describe our soon to be live online resources for freely using and expanding the software through the Neuroscience Gateway Portal.
POST-SHUNTING COGNITIVE OUTCOMES IN NORMAL PRESSURE HYDROCEPHALUS PATIENTS

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Objective: Idiopathic normal pressure hydrocephalus (NPH) is characterized by impairment in gait, continence, and cognition. Ventriculoperitoneal shunting may improve these functions, but evidence for cognitive recovery is mixed, particularly in the executive domain and among patients with comorbid Alzheimer’s disease (AD). This study examined shunt outcomes for NPH patients with a focus on executive function (EF) and comorbid AD.

Participants and Methods: We recruited 37 NPH clinic patients, who on average were 75 years old and had 13 years of education. Participants completed a standard cognitive battery, gait exam, neurologic exam, and caregiver questionnaire at baseline and after 3 and/or 12 months of shunting. Amyloid PET imaging and cerebrospinal fluid (CSF) assays were performed to assess AD pathology. Twelve patients showed AD comorbidity based on these biomarkers (amyloid PET standard uptake value ratio > 1.1 or CSF total tau to Aβ42 ratio > 1). Mixed ANOVA models were used to examine post-shunt outcomes and interaction effect with AD comorbidity.

Results: Regardless of AD status, patients showed significantly improved gait and continence based on clinician rating, as well as improved global cognition and fine motor dexterity based on testing at 3 and 12 months post-shunt. Results for EF were variable and moderated by AD comorbidity. Post-shunt EF improvement by family rating (Frontal System Behavior Scale, FrSBe) was found only in the AD group. Better inhibition on Stroop tests was identified in all patients, but was more pronounced in the AD group. No significant changes were present in attention, speed, language, visuospatial skills, or memory.

Conclusions: Findings suggest that AD comorbidity may contribute to the mixed EF shunt outcome in prior NPH studies. This study was unique in its inclusion of family rating of executive function (FrSBe), which captured significant changes post-shunt. AD comorbidity and family rating should be considered in future NPH shunt studies and clinical evaluation of shunt candidates.
Background: ASD affects an estimated 1 in 68 children in the US (CDC, 2015) increasing substantially since the 1990s. Children with ASD often develop co-morbid psychiatric conditions (Simonoff et al., 2008), and often require acute psychiatric services (Mandell et al., 2008). Despite the need for specialized psychiatric services, this population is often hospitalized in general pediatric psychiatry units (Gabriels et al., 2012). These units may include assessment services, especially to guide disposition planning and service access (Mandell et al., 2005). Consequently, assessment measures designed for use in outpatient settings are used in acute care settings, at times with limited guidance from neurodevelopmental specialists. These tools may capture a unique snapshot of extreme behaviors related to a psychiatric crisis, calling into question the validity of the clinical findings, particularly for long term/developmental diagnoses.

Objectives: This study investigates the sensitivity and specificity of the ADOS-2 when administered in an acute psychiatric care setting.

Methods: Participants were selected from the Rhode Island Consortium for Autism Research and Treatment (RI-CART), a state-wide registry of individuals diagnosed with ASD or related neurodevelopmental disorders. Selected RI-CART participants (n = 80; 70% male, Mean Age = 11.5, sd = 2.9) were enrolled in the registry while admitted to either a pediatric psychiatric inpatient unit (n = 11) or partial hospital program (n = 69); assessment was acquired during admission. Assessments included an ADOS-2 administered by a research-reliable examiner, and other cognitive (K-BIT 2), emotional/behavioral (SRS-2), and adaptive measures (VABS). Parents completed a demographics form. A confirmed diagnosis of ASD was indicated if participants medical charts contained an active diagnosis of ASD and ADOS-2 results were positive for ASD (n = 34). Additional data derived from the Autism and Developmental Disorders Inpatient Collaborative (ADDIRC; n = 736 with confirmed ASD diagnosis and positive ADOS-2; n = 178 with discordant clinical diagnosis and ADOS-2 scores) is being prepared and subsequent analysis will include: 1) more in-depth examination of demographics characteristics, 2) second sensitivity and specificity analysis with the full sample, 2) an examination of individual ADOS-2 items that reliably distinguish between ASD positive and ASD negative participants and, 3) a receiver operating characteristic (ROC) curve to examine how alternative algorithm cut-offs may increase the sensitivity and specificity of the ADOS-2 when used in acute care settings.

Results: Participants presented with numerous psychiatric comorbidities (mean = 2.7, range 1-5 psychiatric dx). Preliminary data include 51 Module 3 and 29 Module 4 ADOS-3 results. In this sample, the Module 3 algorithm produced a sensitivity of 36% and a specificity of 79%; Module 4 algorithm produced a sensitivity of 83% and a specificity of 71%. No differences in sensitivity and specificity were attributed to participants’ gender (p = 0.17).

Conclusions: Results from these analyses suggest that sensitivity and specificity of the ADOS-2 may be lower in acute care compared to previous findings in outpatient samples. This, combined with upcoming analysis examining alternative algorithm cut-offs, aim to provide clinical guidelines to improve the accuracy of the ADOS-2 when used in acute care.
Purpose: Alcohol use, particularly heavy alcohol use, has been consistently implicated in sexual assault risk (Abbey et al., 2001), but heavy alcohol use does not consistently prospectively predict sexual assault (e.g., Gidycz et al., 1995; Parks et al., 2014), and reductions in drinking do not always result in decreases in assault risk (Clinton-Sherrod et al., 2011). Impulsivity might account for these discrepant findings.

Women with a history of sexual assault are more likely to be assaulted if they report higher levels of impulsivity when experiencing negative affect (Messman-Moore, Ward, & Zerubavel, 2013). Further, impulsivity moderates the association between sexual assault and subsequent problem drinking and drug use among college women (Combs, Jordan, & Smith, 2014). However, no studies have examined how impulsivity and alcohol use interact in predicting sexual assault risk for women. The purpose of this study is to examine the role of impulsivity on the association between heavy alcohol use and sexual assault among female college students.

Methods: Incoming female college students (n = 483) completed a baseline assessment before beginning college and were followed over the course of their first year. Moderated logistic regression analyses were run using Hayes's PROCESS macro for SPSS with baseline peak BAC as the predictor, trait impulsivity as the moderator, and first-year rape as the outcome variable. Rape was defined as unwanted oral, vaginal, or anal sex due to incapacitation, threats, or use of force. Analyses were restricted to those 327 women who reported consuming alcohol because of the substantial number of non-drinking first year women.

Results: High BACs in the first year of college were predictive of rape incidence; however, this relationship differed depending on impulsivity. Risk of experiencing rape significantly increased as alcohol use increased, but only for women at mean and lower levels of impulsivity.

Conclusion: Women high in impulsivity exhibit an elevated risk of rape regardless of their alcohol use, indicating that they are already engaging in behaviors that likely expose them to greater contextual risk of assault. Thus, for some women it is imperative that prevention programs target impulsivity and emotion dysregulation as well as alcohol use.
COGNITIVE AND AFFECTIVE FUNCTION IN SCHOOL-AGED CHILDREN EXPERIENCING TRAUMA AND ADVERSITY

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Adversity in early life can take many forms, including poverty, caregiver separation, housing instability and maltreatment (abuse and neglect). Experiencing early life adversity places individuals at risk for psychiatric disorders and is linked to impairments in cognitive and affective functioning later in life. However, it is less clear whether these impairments manifest in childhood, and what specific role maltreatment plays. Thus, the present study examined the impact of early life adversity on cognitive and affective processes in 6-8 year old children recruited from three separate groups: one with high levels of adversity and documented maltreatment (physical/sexual abuse or neglect) (n=18); one with high levels of adversity but with no documented maltreatment (n=18); and one with minimal adversity (n=18). Children were administered the Hearts and Flowers task to test executive function, an episodic memory retrieval task, as well as the Emotional Go/NoGo task to test affective regulation. The maltreatment group had significant performance deficits in executive function compared to the low adversity group (p<0.001), while the high adversity group with no maltreatment had deficits that approached significance compared to the low adversity group (p = 0.052). Children with high levels of adversity, regardless of documented maltreatment, demonstrated increased vigilance and poorer inhibition on the Emotional Go/NoGo task compared to children in the Low Adversity Group (p<0.05). No significant differences between groups were found with regards to episodic memory. These findings demonstrate that stressors in early life are associated with significant deficits in cognitive and affective function that manifest themselves prior to adolescence. Earlier identification of such deficits could allow for targeted cognitive interventions that prevent later negative psychiatric outcomes.
MOTHER AND CHILD EMOTION AND DISTRESS RESPONSES ASSOCIATED WITH MATERNAL ACCOMMODATION OF CHILD ANXIETY SYMPTOMS

Erin O’Connor, MA, Lindsay Holly, PhD, David Langer, PhD, ABPP, Jonathan Comer, PhD, & Donna Pincus, PhD

Family accommodation (FA), the involvement of caregivers in facilitating avoidance of anxiety-provoking stimuli or alleviating distress caused by anxiety, has recently gained attention as an important process involved in the maintenance of child anxiety symptoms. In a child anxiety treatment context, reducing FA is often necessary to facilitate amelioration of child symptoms. Despite these treatment implications, few studies have examined parent and child factors that may impact the likelihood of FA, beyond maternal and child anxiety symptoms (Jones et al. 2015). Current theories of FA suggest that FA behaviors are driven by parents' urge to protect youth from distress (Lebowitz et al., 2013). Thus, it is likely that parents' ability to regulate their own emotion and their perceptions of their child's ability to understand and tolerate distress will influence their use of FA behaviors (Cheron et al., 2009).

Utilizing data from 134 treatment-seeking youth (ages 4-17) at an anxiety clinic, this study examined the association between maternal FA, maternal and child anxiety, emotion regulation (ER), and distress understanding and tolerance. Study variables were measured using mother reports on the Family Accommodation Scale-Anxiety, Difficulties in Emotion Regulation Scale, Depression Anxiety Stress Scale, Multidimensional Anxiety Scale for Children, Intolerance of Uncertainty Scale for Children, Distress Intolerance Inventory for Youth, and the Emotion Expression Scale for Children.

Hierarchical regression analyses were used to examine whether ER factors predict maternal accommodation behavior, above and beyond anxiety levels. The first regression model included mother variables and showed that maternal difficulties with ER and stress significantly predicted maternal FA above and beyond maternal anxiety symptoms (R2=.13, F(3, 98)=4.65, p=.004). The second regression model included child variables and showed that mothers' perceptions of child intolerance of uncertainty, distress intolerance, and emotion awareness significantly predicted maternal FA, above and beyond mother reported child anxiety (R2=.48, F(4, 75)=16.99, p<.001).

These findings suggest that both maternal and child ER and related factors contribute to the likelihood of maternal FA, above and beyond mother and child anxiety levels. Although future research will need to elucidate these associations further, these findings have important implications for parental involvement in the treatment of child anxiety. When parents report high levels of accommodation, it may be important to include parental ER skills and instruction in how to concurrently manage child and parent distress resulting from child anxiety.
SEX-SPECIFIC LINK BETWEEN EMOTIONAL INTOLERANCE AND POOR WEIGHT CONTROL IN CIGARETTE SMOKERS

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Background: Cigarette smoking and poor weight control independently and synergistically increase risk for morbidity and mortality. Although nicotine increases energy expenditure and suppressed appetite resulting in lower body weight, approximately 20% of smokers have overweight/obese body mass index (BMI). Underlying emotion-regulatory dysfunction may play an etiological role in the link between smoking and poor weight control, which may evince unique sex-specific effects. In particular, increased sensitivity to and intolerance of negative psychological and physiological states (i.e., emotional intolerance) amplifies the experience of distress, which in turn, may promote emotion-focused coping behaviors like smoking and emotional eating, resulting in poor weight control. This patterning of effects may be particularly true for female smokers, compared to male smokers, given that female smokers experience greater emotional reactivity following psychological and physiological distress. Thus, emotional intolerance may be a novel, sex-specific mechanism related to poor weight control in smokers.

Method: Participants (n = 577; 52.7% female) were adult daily smokers in the United States recruited through a Qualtrics Online Sample. To index weight control, body mass index (BMI) was calculated based on self-reported weight and height. Perceived accuracy in self-reported height and weight was rated on a 0-100% scale of accuracy confidence. Cases with accuracy confidence > 70% were retained. Emotional intolerance was indexed by a latent construct, indicated by subscales from the Distress Intolerance Scale (DTS) and the Anxiety Sensitivity Index-3 (ASI-3). This latent variable was entered into a structural equation model to evaluate the relations between emotional intolerance and BMI. Participant sex was tested as a moderator of this effect. Level of tobacco dependence was allowed to correlate with BMI in all models.

Results: Participants smoked an average of 17.2±8.3 cigarettes per day. BMI was in the overweight range (27.9±7.3), which did not significantly differ by sex. Obese BMI (≥30) was present in 29.5% of the sample, and was more common in female (33.6%) versus male smokers (24.9%), x²(1) = 5.17, p = .028. Results from the structural equation model indicated that emotional intolerance significantly and positively associated with BMI (β = .11, p = .008). The effect was moderated by sex, such that emotional intolerance was significantly related to BMI in women (β = .18, p = .003), but not men (β = .01, p = .816). Level of cigarette dependence was not significantly related to BMI in the overall model, however tobacco dependence was significantly associated with higher BMI in men (β = .15, p = .013) and lower BMI in women (β = -.14, p = .012).

Conclusions: Compared to male smokers, female smokers appear to be more vulnerable to poor weight control, despite the negative association between tobacco dependence and BMI. Emotional intolerance – reflecting increased sensitivity to and intolerance of distress states – appears to be a novel female-specific psychological mechanism related to poor weight control in smokers. Emotional intolerance is a malleable psychological factor, thus may be a promising therapeutic target for smoking and weight control interventions in female smokers.
DTI MEASURES IN PERIROLANDIC WHITE MATTER NETWORKS ARE ALTERED IN BECTS

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RATIONALE:
Benign epilepsy with centrotemporal spikes (BECTS) is among the most common pediatric epilepsy syndromes, accounting for 10-15% of children with epilepsy. BECTS is a transient epilepsy syndrome in which school age children suffer from seizures characterized by initial face or tongue sensorimotor symptoms, predominantly affecting males. Although EEG features follow an autosomal dominant inheritance pattern, there is low penetrance of the seizure trait in BECTS, thus other factors must impact seizure risk. Stereotyped seizure semiology and interictal epileptiform activity localize to the pre- and postcentral gyri (perirolandic cortex) in these children. Because white matter networks typically mature during the period that children with BECTS have seizures, we sought to evaluate whether white matter organization and integrity in the perirolandic region is altered in children with BECTS and whether these changes correlate with disease status or neuropsychological performance.

METHODS:
21 children with BECTS and 13 healthy controls were recruited. High-resolution MRI data were acquired on a 3T Magnetom Prisma scanner using a 64-channel head coil with the following sequences: DTI (64 encoding directions, TE = 82 ms, TR = 8080 ms, flip angle = 90°, b = 2000 s/mm², voxel size = 2 × 2 × 2 mm); MEMPRAGE (TE = 1.74 ms, TR = 2530 ms, flip angle = 7°, voxel size = 1 × 1 × 1 mm). Eddy current distortion, field inhomogeneities, and head motion were corrected using FSL-FMRIB. FSL's DTIFIT was used to compute a diffusion tensor model at each voxel. Pre- and postcentral gyri were defined using FSL-FMRIB’s Automated Segmentation Tool. Cortical labels were then sunk 1 mm into white matter to define perirolandic regions of interest (ROIs). Mean axial diffusivity (AD), radial diffusivity (RD), mean diffusivity (MD), and fractional anisotropy (FA) were computed for each ROI for each subject and compared to group status by logistic regression, controlling for age. EEG data was collected with a 70-channel electrode cap, sampling rate of 2035 Hz and manually reviewed to identify epochs of wake and sleep (N1/N2). Spikes were manually marked by a board-certified epileptologist. The presence or absence of spikes was compared to intra-hemispheric FA in the perirolandic region by logistic regression. A full clinical neuropsychological exam, including tests for fine motor capabilities, was performed per subject by a board-certified neuropsychologist. Fine motor test scores in the dominant hand were compared to FA in the perirolandic region of the contralateral hemisphere by logistic regression, adjusted for age and gender.

RESULTS:
We significant group differences in AD, RD, MD, and FA in the white matter adjacent to the precentral (AD p=0.02; RD p=0.05; MD p=0.06; FA p=0.02) and postcentral (AD p=0.015; RD p=0.02; MD p=0.015; FA p=0.06) gyri. Hemispheres with presence of spikes exhibit significantly higher FA than non-spiking hemispheres (precentral p=0.03; postcentral p=0.05). FA in the postcentral gyrus shows a negative correlation with fine motor task performance (p=0.01), with a similar trend in the precentral gyrus. Additionally, DTI data in the perirolandic region from the healthy population shows significantly more inter-subject variability than in the BECTS population, and significant gender differences are observed in this same data between males and females in the healthy population which are not observed in BECTS, a male-predominant disorder. Healthy males showed more similar white matter properties to BECTS subjects than healthy females.

CONCLUSIONS:
White matter abnormalities observed in the seizure onset zone of this age-specific epilepsy syndrome provide a new model of structural factors that may underlie focal childhood epilepsy, and may also provide an explanation for the neuropsychological co-morbidities and gender differences observed in BECTS.
MINORITY STRESS AND EATING BEHAVIOR AMONG OVERWEIGHT AND OBESE SEXUAL MINORITY WOMEN

Emily Panza, MS, Kara B. Fehling, MS and Edward A. Selby, PhD

Background: Sexual minority women are nearly three times more likely to be overweight or obese than their heterosexual counterparts, but little research has investigated potential mechanisms that underlie this disparity (Boehmer, Bowen & Bauer, 2007). One such mechanism may be minority stress. Sexual minority women are members of multiple socially stigmatized groups: being non-heterosexual, being female, and for 60% of sexual minority women, being overweight. As a result, non-heterosexual women are exposed to multiple sources of minority stress, including chronic experiences of social stigmatization (i.e. being treated unfairly or differently) as well as internalized shame and hostility about these stigmatized identities. These minority stressors may generate significant stress and negative emotion, and in an effort to reduce distress, sexual minority women may use overeating and binge eating as coping strategies. Over time, binge eating and overeating may promote weight gain and risk for obesity, resulting in a positive feedback loop of stigmatization, stress, overeating, and weight gain.

Methods: To test this proposed model, the current study used Ecological Momentary Assessment (EMA) to examine whether lifetime and acute minority stress increased risk for overeating and binge eating in sexual minority women. 55 overweight or obese (BMI>25) sexual minority (e.g., lesbian, bisexual) women were recruited from the community to complete baseline assessments of eating behavior and minority stress due to sexual orientation, weight, and gender. For the following five days, participants used a smartphone application to report experiences of stigmatization, overeating, and binge eating five times daily.

Results: Findings revealed promising support for the proposed model. As expected, women who reported greater lifetime heterosexist, gender, and weight-based stigma reported higher baseline levels of disordered eating and binge eating. Acute stigma events during the EMA period were associated with greater concurrent overeating at the same time point. Being stigmatized on any given day was associated with more overeating and binge eating on that day, compared to days without experiencing stigma.

Discussion: The current study provides preliminary support for minority stress as a mechanism of the obesity disparity among sexual minority women. Given the paucity of research in this area and this study’s preliminary nature, findings justify future research to unpack the relevance and significance of minority stress as a risk factor for obesity in this group. This will be essential for developing effective, informed, and tailored interventions to reduce obesity and to improve health among sexual minority women.
PROFILES OF ADAPTIVE BEHAVIOR IN CHILDREN AND ADOLESCENTS WITH ASD

Kayla Perkins, BA; Carolyn E.B. McCormick, PhD; Stephen J. Sheinkopf, PhD

Introduction: Autism spectrum disorder (ASD) is characterized by significant heterogeneity (Klopper, Testa, Pantelis, & Skafidas, 2017). Research using the first edition of the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984) highlighted an “autism profile” of adaptive skill deficits (Carter, et al., 1998). The purpose of this study was to identify subgroups of people with ASD with different adaptive skill profiles based on Vineland-II scores.

Method: The sample was comprised of 451 individuals (ages 3.01-21.92; Mage = 11.42, SD = 4.69, 351 males) selected from a state-wide ASD community based sample. All participants had a guardian-reported community diagnosis of ASD and a positive Autism Diagnostic Observation Schedule (ADOS-2) assessment, as well as a completed Vineland Adaptive Behavior Scales, Second Edition (Vineland-II) (Sparrow, Cicchetti, & Balla, 2005). Latent class analysis (LCA) was used to identify classes based on Vineland-II domain scores. A linear mixed effects model (LME) with age as a covariate was used to examine the adaptive behavior profiles identified by the LCA.

Results: LCA identified 4 classes: class 1 (11.3%, n = 51), class 2 (35.9%, n = 162), class 3 (37.3%, n = 168), and class 4 (15.5%, n = 70). The LME revealed a main effect of class such that classes differed in level of overall functioning: class 1 has the lowest Vineland-II domain scores, followed by class 2, class 3, and class 4 (F(3, 173.12) = 607.75, p = .000). The model also revealed a significant interaction between class and domain scores (F(9, 227.72) = 7.91, p = .000). Class 1 exhibited relative strength in the motor skills domain when compared to the communication daily living skills, and socialization domains. Class 1 also demonstrated a relative strength in socialization skills compared to daily living skills and communication skills. Classes 2 and 3 exhibited a pattern of relatively low socialization domain scores and stronger motor scores as compared to daily living and communication skills. Class 4 also exhibited the lowest scores on the socialization domain, but the motor skills domain was not significantly higher than communication or daily living skills.

Discussion: In a community-based sample, LCA identified four clusters of individuals with ASD who differed in both overall level of adaptive functioning and in their profiles describing relative strengths and weaknesses in specific functional domains. Relative strengths in motor skills and weaknesses in social skills was a relatively consistent pattern across groups. Individuals with especially low levels of adaptive functioning had a relatively flatter skill profile, without evidence of a relative weakness in social skills. This pattern may indicate a floor effect for this measure at levels of more significant impairment, but also suggest that the specificity of social impairments in ASD are more evident in individuals with relatively stronger overall adaptive skills.
Among sexual minority couples, discrimination is a unique form of stress that can impact both partners. Minority stress theory posits that discrimination negatively impacts personal health, but has not been well-articulated or studied interpersonally within same-sex couples. However, the effects of stress on health can spill over across romantic partners, and health behaviors are also known to play out interdependently within romantic relationships. The current study aimed to expand our understanding of the influence of minority stress on health into a dyadic context in romantic relationships. Studies of minority stress also have typically focused on high-risk behaviors (e.g., condomless sex, drug use), and less on daily health behaviors that affect health cumulatively. The current study focuses on whether discrimination negatively impacts sleep, diet, and exercise among same-sex couples in line with minority stress theory.

Sixty same-sex couples (30 male, 30 female) completed an online observational study, including standardized self-report measures of discrimination, sleep disturbance (i.e., quality, depth, restoration), poor diet (e.g., soft drinks, fried food), healthy diet (e.g., fruits, vegetables), and physical exercise (e.g., cardiovascular, strength). 30.8% of participants identified as a racial or ethnic minority. The average age of participants was 30 years (SD = 10) and the average relationship length was 5 years (SD = 6 years; mode = 1.75 years). Actor-partner interdependence models for indistinguishable dyads tested associations between one’s own discrimination and one’s own health behaviors (i.e., actor effect), as well as one’s partner’s discrimination with one’s own health behaviors (i.e., partner effect). Exploratory analyses tested interactions by couples’ sex (i.e., male vs. female).

One’s own discrimination affected own sleep (B=.18, p<.05). In addition, one’s partner’s discrimination affected own sleep (B=.13, p<.05). Own discrimination was also positively associated with own poor diet, but not partner’s diet (B=.06, p<.05). No actor or partner effects were significantly associated with healthy diet or exercise (p’s > .05). No effects varied significantly across couples’ sex (all interaction p’s > .05).

Findings indicated that discrimination appears to impact some daily health behaviors of sexual minority individuals and their romantic partners, particularly sleep. These results are among the first to document the cross-over effects of sexual minority stress on one’s own and one’s partner's daily health. The interpersonal impact of discrimination on same-sex relationships should be considered in both prevention studies and public policy.
RELATIONSHIPS AMONG SEDATIVE/ANTICHOLINERGIC DRUG BURDEN, COGNITIVE IMPAIRMENT, AND BALANCE CONFIDENCE IN COMMUNITY-DWELLING OLDER ADULTS

Sarah Pillemer, PhD, Seth A. Margolis, PhD, Lauren Kenney, BA, Lori Daiello, PharmD, ScM, Geoffrey Tremont, PhD

Sedative/anticholinergic drug exposure, measured by the Drug Burden Index (DBI), has been linked to cognitive impairment and falls in older adults. Lower balance confidence is also related to falls and may provide information about future fall risk. Research examining interrelationships among the DBI, balance confidence, and cognition is lacking. This cross-sectional study examined associations between the DBI and balance confidence, and explored whether their hypothesized negative relationship is moderated by cognition.

Participants were community-dwelling older adults (N=55, M age=71.8 ±8.8) referred for neuropsychological evaluation of suspected dementia. Participants completed Mini Mental Status Exams (MMSE), provided medication regimens (DBI scores were a sum of how much each sedating and/or anticholinergic agent exceeded FDA-approved minimum effective doses), and self-reported balance confidence (Activities-Specific Balance Confidence Questionnaire) and falls in the preceding year. The DBI was positively skewed; therefore, Spearman correlations and ordinary least squares regression with 95% non-parametric bootstrapped confidence intervals were utilized to test our hypotheses.

As hypothesized, DBI scores were significantly and negatively correlated with balance confidence (r= -.29; p=.03). Those with higher DBI scores also tended to report more falls (r=.24, p=.09). Moderation analysis showed that greater drug burden was associated with diminished balance confidence but only when MMSE scores were ≤26 (p<.01).

Drug burden negatively relates to balance confidence and falls in older adults with cognitive impairment. These findings may inform physicians’ prescribing practices, as those with reduced MMSE scores may have greater fall risk with sedative/anticholinergic exposure due to iatrogenic effects on balance confidence.
MATERNAL PARENTING STRESS IS ASSOCIATED WITH ADVERSE INFANT SOCIAL AND EMOTIONAL DEVELOPMENT AT SIX MONTHS POSTPARTUM

Jamilah Pittman, BSW, Courtney Contente, BS, Rebecca Newland, PhD, Ronald Seifer, PhD, Stephanie Parade, PhD

Introduction: Maternal parenting stress has been associated with delayed child language development and increased behavioral problems in toddlers and adolescents (Benzi et al., 2004; Creaset & Jarvis, 1994; Magill & Harrison, 2001). Furthermore, there have been numerous studies suggesting elevated parenting stress among parents of toddlers with disabilities or developmental delays (Ornstein Davis & Carter, 2008; Baker et al., 2002, 2003). While maternal parenting stress has been extensively associated with developmental delay in toddlers and older children, there has been minimal research conducted to explore the association between maternal parenting stress and infant social-emotional development. As parenting stress is associated with non-optimal child development outcomes, it is then important to understand and identify risk factors early to prevent adverse outcomes for mothers, children, and families.

Research question: Is maternal parenting stress correlated with infant developmental outcomes at six months old?

Methods: Data was drawn from an ongoing study measuring maternal stress and infant health and development. The current report includes 151 mothers over the age of 18, who were recruited during pregnancy from Women, Infants, and Children (WIC) clinics throughout the state of Rhode Island. Of the 151 mothers, 42% were white, 18% black, 7% biracial, and 33% identified as another race. Forty-two percent of mothers were of Hispanic ethnicity. Sixty-four percent of mothers were unemployed, and 46% were raising their infant as a single parent. There were 52% female infants in the report.

Mothers were asked to complete a series of questionnaires measuring maternal stress and infant development during pregnancy, and again at a 6 month and 12 month assessment. This study uses data from the 6 month assessment. Maternal parenting stress was self-reported through the Parental Stress Index Short Form (Abdin, 1995). Infant development was self-reported through the Ages and Stages Questionnaire (Bricker et al., 1999), which includes questions that span five subscales measuring infant skills: Communication, Gross Motor, Fine Motor, Problem Solving, and Personal-Social. Data analyses controlled for infant age, gender, and prematurity.

Results: Correlational analyses showed a significant negative association between total PSI stress score and three subscales of the ASQ at 6 months. Mothers who reported higher parental stress had infants with lower communication scores (r = -.270, p = .001), lower problem solving scores (r = -.203, p = .016), and lower personal social scores (r = -.228, p = .007). Elevated parental stress was not significantly correlated with infant gross motor (r = -.137, p = .109) or fine motor scores (r = -.094, p = .273).

Discussion: These results suggest that elevated maternal parenting stress is associated with delayed infant social and emotional development at six months old. The delay in exclusively social and emotional subscales of the ASQ, rather than the motor subscales, is congruent with some previous literature suggesting associations between parenting stress and behavioral and cognitive delays in older children.

It is unknown whether parenting stress is a cause or effect of delayed infant development; it is likely that both contribute to one another bidirectionally. Similarly, there could be other factors (e.g., maternal mental health, socioeconomic risk), which contribute to both parenting stress and infant social-emotional development. Early identification and understanding of these risk factors could prevent later adverse outcomes for mothers, children, and families. Further longitudinal research could help increase our understanding of this dynamic relationship.
EXAMINING THE APPLICATION OF PEDIATRIC SELF-MANAGEMENT MODEL IN COLLEGE STUDENTS WITH INFLAMMATORY BOWEL DISEASES

Jill Plevinsky, MA, Rachel Greenley, PhD, Debra Lobato, PhD

Objectives
This study applied the pediatric self-management model (Modi et al., 2013) in college students with inflammatory bowel diseases (IBD). We examined how modifiable, theoretically-derived individual, community, and healthcare systems factors contribute to levels of self-management behaviors, including medication adherence, disease management skills, and avoidance of substance use.

Methods
Seventy-six college students (ages 18-25) who had not yet transitioned to adult care completed the IBD Self-Efficacy Scale for Adolescents and Young Adults, the Student Adaptation to College Questionnaire, and reported whether their provider communicated with them about medication adherence, transition readiness, or substance use within the year. Participants also completed a Visual Analogue Scale (VAS) and the Adolescent Medication Barriers Scale (AMBS) to assess medication adherence; the Transition Readiness Assessment Questionnaire (TRAQ) and the Allocation of Treatment Responsibility Scale (ATR) to assess disease management skills; and answered questions assessing tobacco use, alcohol binge drinking, and marijuana during the past 30 days.

Results
Multiple regressions revealed that lower self-efficacy, lower college adjustment, and greater patient-provider communication about medication adherence together were associated with poorer medication adherence (VAS: p=.034; AMBS: p<.001). Additionally, lower self-efficacy, lower college adjustment, and lower patient-provider communication about transition readiness together were associated with poorer disease management skills (TRAQ: p=.002; ATR: p=.009). Logistic regressions showed that lower self-efficacy, lower college adjustment and lower patient-provider communication about substance use together explained variance in a greater likelihood of endorsing tobacco use (59%), binge drinking (11%), and marijuana use (30%) with medium effect sizes.

Conclusions
Results support the application of the pediatric self-management model in college students with IBD. Self-efficacy, college adjustment, and domain-specific patient-provider communication contributed to the self-management behaviors assessed. The cross-sectional nature of the study may explain inconsistent findings in patient-provider communication across self-management behaviors. Future studies should examine how these factors impact self-management throughout the college experience.
Background: Single gene disorders replicating aspects of otherwise heterogeneous neuropsychiatric conditions may help model relevant pathophysiologic mechanisms. CS, caused by mutations in X-linked NHE6, a major regulator of endosomal pH, is one such illness characterized by neurodevelopmental abnormalities including autism, cognitive disability, and neurodegenerative pathology. NHE6 mutations may, therefore, offer insight into the role of disrupted endosomal protein trafficking in neuropsychiatric disease. Here, we discern how NHE6 mutations impact human brain morphology focusing on corpus callosum (CC) and cerebellum, structures intensely studied in autism.

Methods: 24 T1-weighted midsagittal clinical MRIs from 13 males, ages 0.6-11 years, were identified from the International CS and NHE6 (SLC9A6) gene study network. Measures of brain regions including CC and cerebellum were collected and compared to age-matched reference data using repeated measures one-way ANOVA or between individual subjects at different time points using regression analysis.

Results: Fronto-occipital diameter (FOD) of brains of CS individuals was significantly smaller than median age-matched reference data (p=0.0001), while most CC measures including antero-posterior diameter of CC/FOD were significantly greater than the median (p=0.0001). Additionally, we discerned several MRI signatures of cerebellar disease that may prove useful for diagnostic recognition of CS.

Conclusions: In CS, cerebellar atrophy shows distinctive features, which may serve for diagnostic purposes. Further, CC is larger than expected. The reason for this is unclear, but overgrowth seems unlikely, as megalencephaly is usually seen in other mega-CC syndromes. Instead, abnormal endosomal trafficking leading to protein accumulation and axonal hypertrophy seems more likely and will be explored further in CS mouse model.
GENDER DIFFERENCES IN NON-SUICIDAL SELF-INJURY CHARACTERISTICS AMONG ADULT PSYCHIATRIC INPATIENTS

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Non-suicidal self-injury (NSSI) has been linked to suicidality and several other negative psychiatric outcomes (Klonsky et al., 2003). Given the emotion-regulatory function of NSSI (Nock, 2009) and differences in how men and women regulate their emotions (Nolen-Hoeksema, 2012), research focused on gender differences in NSSI is needed. Emerging evidence suggests that men and women may utilize different NSSI methods, with women tending to use methods involving blood, such as cutting or scratching, whereas men are more inclined to use hitting or burning (Sornberger et al., 2012). Research has not, however, found gender differences in the number of NSSI methods used (NSSI versatility), and differences in NSSI frequency have been inconsistent (e.g. Andover et al. 2010; Sornberger et al., 2012). To date, most research on gender differences in NSSI has been conducted with nonclinical samples. Therefore, the purpose of the present study was to examine gender differences in NSSI prevalence and characteristics in an adult inpatient sample, a group at a higher risk of self-injury (Zlotnick et al., 1996). Given extant research, we hypothesized that women would report engaging in NSSI at a significantly higher rate than men, and that they would be significantly more likely to endorse using NSSI methods involving blood. Additionally, we hypothesized that men would report using drugs or alcohol directly before engaging in NSSI at a significantly higher frequency than women, and that there would be no significant differences in lifetime NSSI frequency or lifetime NSSI versatility. This sample included 390 participants recruited for two ongoing studies of suicide risk. NSSI characteristics were assessed using the SITBI-I (Nock et al., 2007). Independent samples t-tests and chi-square tests were conducted to analyze group differences in NSSI characteristics, as appropriate. Forty-four percent of participants (n = 173) reported engaging in NSSI at least once in their lifetime. Women reported a significantly higher rate of engagement in NSSI, χ² (1) = 16.29, p < .001, Φ=.23, with 66.2% of women and 33.8% of men reporting NSSI histories. There was no significant difference between men (M = 52.93, SD = 72.96) and women (M = 52.03, SD = 61.91) in reported number of lifetime episodes of NSSI, t(105) = .07, p = .95, d = .01. Although there were no gender differences in the number of NSSI methods utilized (t(140) = -1.55, p = .13, d = .26), or the types of method chosen, there was a nonsignificant trend toward men being more likely to report hitting behaviors (χ² (1) = 3.25, p = .071, Φ=.15) and skin scraping behaviors (χ² (1) = 3.10, p = .078, Φ=.15) than women. In terms of NSSI context, men (M = 34.94, SD = 38.05) reported using drugs or alcohol directly before engaging in NSSI at a significantly higher frequency than women (M = 21.31, SD = 36.56), t(135) = -2.05, p < .05, d = .37), consistent with extant research. Although there were no notable gender differences in NSSI methods in our sample, in contrast with previous research, our results suggest that there may be differences in the behaviors preceding NSSI, emphasizing the importance of considering gender when treating patients who engage in NSSI.
COMPLEX POLYPHARMACY IN PATIENTS WITH SCHIZOPHRENIA-SPECTRUM DISORDERS PRIOR TO A PSYCHIATRIC HOSPITALIZATION: PRESCRIBING PATTERNS AND ASSOCIATED CLINICAL FEATURES

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Background: Current evidence-based guidelines provide unclear support for many common polypharmacy practices in schizophrenia. Excessive or complex polypharmacy (≥ 4 psychotropics) has been studied in patients with bipolar disorder, but not in schizophrenia to date.

Methods: We conducted a digital medical record data extraction of 829 patients consecutively admitted to a psychiatric hospital and diagnosed with schizophrenia-spectrum disorders.

Results: In those prescribed psychiatric medication pre-admission, 28.1% (n = 169) met criteria for complex polypharmacy. Complex polypharmacy patients were older, female, White, and disabled, and had more comorbidities compared with those without complex polypharmacy. In multivariable analysis, complex polypharmacy patients remained more likely to be White, disabled, and to have a comorbid anxiety disorder, metabolic condition, neurological condition, and tobacco use disorder compared with non-complex polypharmacy patients; they were also less likely to be diagnosed with psychotic disorder NOS.

Conclusions: Even though there is little evidence to support complex polypharmacy in schizophrenia, rates were relatively high in patients requiring hospitalization. Future research is needed to study the risk-benefit profile for these patients, especially considering their higher medical comorbidity.
Background. Family based treatment is important for treating youth with chronic illness, functional somatic symptoms, and psychiatric concerns as children live within a larger family system. A core component of psychological treatment is directly challenging an individual’s maladaptive beliefs or cognitive distortions. Although this is a common component of psychological treatment, limited work has examined how family beliefs regarding chronic medical concerns and psychiatric illness change during intensive family treatment. Prior work examining illness beliefs has been limited to specific disease groups and focus on the individual patient or parent (e.g., adults with IBD, parent adjustment & illness beliefs for children with cancer). Existing research, however, has not assessed the perception of change in family based illness beliefs following intensive family-based treatment. The present study sought to address this gap in the literature by assessing perception of family illness beliefs before and after admission to a family focused partial hospital program.

Method. Children 6-18 years of age (M=13.49, SD=2.94; 37% male) admitted to the Hasbro Partial Hospital Program (HPHP) whose families agreed to participate in research (n=95) were included in the current study. HPHP admission criteria require both a psychiatric and medical diagnosis. Participants completed questionnaires at discharge that mirrored the assessment battery completed at HPHP admission. Children and parents who completed the 30-item Illness Beliefs Questionnaire (IBQ) at both admission and discharge were included in the current study (children: n = 45; parents: n = 69). The IBQ was designed to assess family members’ beliefs about the child’s illness across subscales assessing the perceived role of stress in illness, how much control and impact the illness has over family life, family understanding of the illness, frustration regarding the illness, and how hopeful the family is about illness control. Families were discharged when they were deemed clinically stable to return to outpatient care.

Results. Children were admitted for an average of 34.06 calendar days (SD=10.93, range=18-99). Racially, the sample was primarily Caucasian (76%; n=80); ethnically, only 5% (n=5.3) were Latino. Parent and child IBQ subscales of Psychological Factors, One Year Impact, Illness Impact, Understanding, Helplessness and Frustration were compared from admission to discharge. For children, there was a significant decrease in Illness Impact from admission to discharge (t=3.61, p=.001). Parents reported a significant increase in Understanding (t=-4.611, p<.001), and a significant decrease in Illness Impact (t=2.293, p=.025) from admission to discharge. Parent-reported increase in Psychological Factors (i.e., family belief that stress impacts illness) approached significance (t=-.968, p=.054).

Conclusion. Result from the current study suggest that after intensive, family-based, day-treatment intervention, both children and parents perceived a decrease in the extent to which the child’s illness directly impacts day-to-day family functioning. This finding may have important implications for family quality of life. Further, parents perceived their family to have an improved understanding of their child’s illness following HPHP treatment. Though not statistically significant, parents also reported an increased family belief that stress impacts their child’s illness following treatment. Collectively, results suggest family-based illness beliefs, especially beliefs about a child’s day-to-day functioning, are directly affected by intensive family-based treatment. Additional research should continue to examine the link between family illness beliefs and other treatment outcomes (e.g., symptom reduction, quality of life), as results from the present study suggest illness beliefs are amenable to treatment.
MATERNAL CHILDHOOD ADVERSITY, ROMANTIC RELATIONSHIP SATISFACTION, AND INFANT MENTAL HEALTH

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Adverse childhood experiences (ACES) are associated with both physical and mental health outcomes during childhood and adulthood (Bellis et al., 2014; Van Niel et al., 2014; Wade et al., 2016). Additionally, there is evidence that ACES contribute to adult close relationships, including inter-parental romantic relationship quality and parenting behavior (Murphy et al., 2014; Chung et al., 2009). Yet few studies have examined intergenerational effects of parental ACES on offspring mental health. We examined associations of maternal ACES, maternal romantic relationship satisfaction, and infant mental health in the first 12 months of life.

Participants consisted of 290 pregnant mothers enrolled in an ongoing study of maternal early adversity and infant development. Mothers were racially and ethnically diverse (42% white, 18% black, 8% biracial, 32% other races; 40% Hispanic). Sixty percent of mothers had less than or equal to a high school degree and 66% were unemployed. All families received public assistance. Mothers reported on their adverse childhood experiences and current stressors during a prenatal enrollment assessment, and their romantic relationship satisfaction prenatally and at 6 and 12 months postpartum. Assessments of infant mental health included measures of infant social-emotional development at 6 months postpartum, and infant internalizing and externalizing behavior problems at 12 months postpartum. Associations of ACES, maternal stress in pregnancy, romantic relationship satisfaction, and infant mental health were examined using simple correlations and multiple regression.

At the prenatal assessment, maternal ACES were negatively associated with romantic relationship satisfaction ($r = -.17, p = .005$). In addition, maternal stress in pregnancy was negatively associated with romantic relationship satisfaction ($r = -.34, p = .001$).

At six months postpartum, there was an interaction of maternal ACES and romantic relationship satisfaction in the prediction of infant social-emotional development ($B = .18, p = .037$). ACES were more negatively associated with infant social-emotional development when mothers reported low satisfaction in their romantic relationships ($B = -.55, p = .069$) compared to when mothers reported high satisfaction ($B = -.25, p = .142$).

At twelve months postpartum, there was a positive association between the number of maternal ACES and infant externalizing behaviors ($r = .20, p = .038$) as well as a positive association between maternal stress in pregnancy and infant externalizing behaviors ($r = .22, p = .02$). Relationship satisfaction, however, was not associated with internalizing or externalizing behavior problems at 12 months.

These findings underscore the importance of maternal ACES for infant mental health. Maternal ACES have lasting effects into adulthood, and we demonstrate preliminary evidence of an intergenerational effect on infant mental health. A supportive romantic partner may buffer infants from the effects of maternal ACES. Interventions to support mothers and dyadic romantic relations across the perinatal period may enhance infant health outcomes.
CLOSED NEST PRE-WEANING ENVIRONMENT REDUCES MEMORY DEFICITS CAUSED BY NEONATAL HYPOXIC ISCHEMIC INJURY

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Background: Hypoxic-Ischemic (HI) brain injury occurs in approximately 1-7 of every 1000 term live births (Volpe, 2008). The hippocampus and prefrontal cortex are particularly susceptible to HI injury, resulting in problems with attention and memory for the majority of surviving infants with moderate injury. Animal studies have demonstrated that maternal care-taking behavior (CTB) improves learning and memory in normally developing offspring through alterations in hippocampal proteins and synaptogenesis. Through this mechanism, CTB may prevent hippocampal deficits observed with HI. CTB can be highly influenced by environmental stress and may, therefore, mediate the effects of such stressors on injury and contribute to repair for these neurologically high-risk neonates. We investigated whether altering early environment for maternal CTB impacts learning and memory in offspring with HI.

Design/Methods: The Rice-Vannucci model was used to induce HI in 26 postnatal day (PND) 7 Long-Evans pups. Litters were randomized to a closed nest (CN) (additional nesting box inside standard Plexiglas cage) or normal animal facility (AF) condition. To assess spatial navigation as well as short and long-term memory, animals were tested in Morris Water Maze (MWM) task from PND 35-45 for 3 days of visible platform (VP) training and 5 days of invisible platform (IP) testing over 4 trials per day. The time it took to reach the platform was recorded in seconds.

Results: There was a significant interaction effect of housing condition and sex in VP (p=.003). Females reared in the CN condition reached the platform significantly faster (10.3 sec) than all other groups, while females in the AF condition took the longest to reach the platform (17.6 sec). In the IP test, there was a trend (p=.075) for all animals in the CN condition (9.8 sec) regardless of sex to reach the platform faster than those in the AF condition (11.8 sec). There was also a trend (p=.11) for females in the CN condition to reach the platform in less time (8.95 sec) than males (10.838 sec), and for males in the AF condition to reach the platform faster (11.03 sec) than females (12.65 sec).

Conclusions: These findings indicate that, in comparison to AF housing, CN housing during the pre-weaning period improves female animals’ performances on visible platform training. Males in the CN condition improve over time as well, demonstrating a more robust learning and memory profile for animals in the CN condition regardless of sex in the following days of invisible platform testing. Females appear to benefit most from the CN condition, which may in part be due to an equalizing effect of CN, distributing CTB more equally across sexes as opposed to the usual preference for male offspring in anal-genital licking. These results demonstrate that buffering environmental stress may lessen the extent of learning and memory deficits caused by HI.
PREDICTING LENGTH OF STAY THROUGH SELF-REPORT

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Background:
Adolescent suicide is a major public health problem, recently advancing to the 2nd leading cause of death (CDC, 2014). Adolescents with suicidal thoughts and behaviors (STBs) are often seen in the emergency department, and later admitted to inpatient psychiatric unit or facility (Goldstein et al, 2007). It is unclear if longer stays in psychiatric inpatient units improve outcomes (Parsons, 2006). In fact, some negative repercussions include cost to hospitals, insurers, and patients themselves, and adolescents often report fear of stigma after their hospitalization (Stensland et al 2012, Moses, 2011). The research is currently lacking in identifying potential predictors of longer hospital stays that could help to address costs to patient caregivers, insurers, and inpatient units. Studies differ on whether patient-level factors, such as diagnoses or severity, impact length of stay (LOS) on inpatient units (Gifford, E., & Foster, E. M., 2008). The aim of this study is to examine the relationship between past behavior, length of stay, and self-reported predicted future STBs for adolescents on an inpatient unit.

Methods
100 adolescents hospitalized for STBs (Mean age= 15.22; 71% female, 29% white) were recruited from an inpatient psychiatric hospital in the northeastern region of the United States. Participants completed the Columbia Suicide Severity Rating Scale (C-SSRS, Posner 2008) and the Self-Injurious Thoughts and Behaviors Interview (SITBI, Nock et al 2007) while hospitalized as part of a larger study (R01MH105379 Biomarkers, social, and affective predictors of suicidal thoughts and behaviors in adolescents). Chi-squared tests were used to examine the relationship between past STBs and Length of Stay, and bivariate point-biserial correlation was run for the relationship between Length of Stay and self-reported predicted future STBs.

Results:
A chi-squared test did not find a significant relationship between LOS and a past suicide attempt X2 (1, N = 100) = .288, p=.59, making a plan to kill oneself in the past X2 (1, N = 100) = .001, p=.97, lifetime non-suicidal self-injury X2 (1, N = 92) = 3.41, p=.06, or deciding how or when to kill oneself in the month prior to hospitalization X2 (1, N = 100) = .004, p=.94. However, there was a significant relationship between self-reported predictions of future STBs and LOS. Predicted self-reported likelihood of having thoughts of killing oneself (rpb = .397, n = 99, p <.001), making a plan to kill oneself (rpb = .391, n = 100, p <.001), attempting to kill oneself (rpb = .451, n = 98, p <.001), and non-suicidal self-injury (rpb = .367, n = 100, p <.001) in the future all had a statistically significant relationship with LOS.

Discussion:
Findings from this study suggested that past STBs were not significantly associated with LOS. However, adolescents’ personal predictions about their future STBs were associated with LOS. These findings were consistent across all self-reported suicide behaviors (future ideation, plan development, and attempts), with medium effect sizes (.367 - .451) between LOS and adolescent predictions. These findings provide a clinical rationale for longer LOS among select youth. Implications for translational application of personalized treatment on adolescent psychiatric inpatient units will be discussed.
PILOT ANALYSIS OF FACIAL EMOTION RECOGNITION IN CHILDREN: AN EVALUATION OF DIFFERENCES IN EMOTION RECOGNITION BETWEEN HIGH AND LOW IRRITABILITY YOUTHS

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Background: Irritability is a large concern for today’s youth: it is the most common reason families seek psychiatric evaluation for their child, and it is an associated symptom for several Diagnostic and Statistical Manual (DSM) diagnoses, including a manic episode in BD, a major depressive episode in children, GAD, ADD, ODD, and DMDD. Given that childhood irritability is also linked to impairment in adulthood, it is of significant importance to understand the specific cognitive deficits associated with irritability so that these impairments can be addressed in future treatments. Previous research has shown that children diagnosed with disorders involving irritability display impairments in emotion recognition, but no research has explored the specific role of irritability as a potential causal factor of this deficit. To address this, we present a pilot analysis of differences in facial recognition among high irritability youths vs. low irritability youths. We hypothesized that high irritability youths would display greater impairment in a facial recognition task than low irritability youths.

Method: Children ages 8-12 years participated in an ongoing IRB-approved study at Bradley Hospital and Brown University after informed parent consent and subject assent. Participants were divided into two groups based on parental ratings of their child’s irritable behavior on the 6-item Affective Reactivity Index (ARI) (1) high irritability (n=20), or children who received a score of 5 or above on the ARI, and (2) low irritability (n=20), or children who received a score of 4 or below on the ARI. Facial recognition was evaluated through performance on the Diagnostic Analysis of Nonverbal Accuracy (DANVA). Participants were asked to classify both high and low intensity child and adult emotional faces as happy, sad, angry, or fearful. Facial stimuli were photographs of children and adults from Emory University.

Results: We found significant between-group differences in performance on low intensity sad child faces; that is, children in the low irritability group committed significantly greater errors in identifying low intensity sad child faces than did children in the high irritability group [t(38) = 2.45, p < .05]. Post-hoc comparisons revealed that this effect was partially driven by children from the low irritability group misidentifying low intensity child sad faces as angry [t(38) = 2.34, p < .05]. Participants did not differ in their performance of classifying adult faces.

Conclusions: While preliminary, our data suggest that low irritability youth perform worse at discerning between low intensity sad and angry child faces. This finding could be explained by our unique design of dividing participants by irritability level rather than diagnosis, and could help to provide insight to previous findings examining facial recognition among specific disorders. We aim to continue to collect data in this sample in the hope of further exploring this finding and providing a better understanding of irritability for future treatment.
REACTION TIME VARIABILITY IS ASSOCIATED WITH DISTINCT NEURAL SIGNATURE IN PTSD

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Background: While many investigations have implicated attention abnormalities in PTSD, one key marker of attention deficits, intraindividual variability (IIV), has been less studied. IIV is reliably found in ADHD and is associated with altered patterns of resting state connectivity among large-scale intrinsic connectivity networks (ICNs). IIV can be modeled using an ex-Gaussian approach, which models a performance distribution as the sum of a normal (mean μ and variance σ²) and an exponential random variable (λ). The aim of the current study was to examine IIV (σ² and λ) in PTSD subjects and determine an IIV neural signature.

Methods: Male military veterans with PTSD (N = 32; deployed to Iraq or Afghanistan) and healthy age-and-gender-matched community controls (N = 20) completed the Attention Network Task (ANT) and underwent functional magnetic resonance imaging (fMRI) to assess resting-state functional connectivity (rsFC). Reaction time properties of the ANT were assessed with ex-Gaussian modeling. A resting-state connectome was estimated and subjected to a joint independent components analysis (jICA) to examine the relationship between reaction time properties and rsFC.

Results: PTSD participants had significantly elevated, μ and RTV compared to controls. JICA revealed 2 components with significantly increased expression in the PTSD group: a parietal component and a parietal/occipital component. The parietal component, which showed hyperconnectivity of the dorsal attention network with other resting-state networks, was associated with decreased μ, but was not related to either σ or τ. The parietal/occipital component, on the other hand, showed hyperconnectivity of the visual network with several attention networks, and was associated with decreased σ and τ, but not μ.

Discussion: The present findings show that PTSD subjects not only had longer reaction times on an attention task, but also greater reaction time variability compared to controls. These two deficits may have distinct and dissociable neural circuitry. The former was linked to dorsal attention network connectivity, while the latter was linked to visual network connectivity. These findings may improve our understanding of the neural mechanisms underlying PTSD.
hnRNPA2, a component of membraneless organelles, forms inclusions when mutated in a syndrome characterized by the degeneration of neurons, muscle, and bone. Here we provide a unified structural view of hnRNPA2 self-assembly, aggregation, and interaction with other granule components, as well as the distinct effects of small chemical changes including disease mutations and posttranslational modifications on these assemblies. The hnRNPA2 low complexity (LC) domain is compact and intrinsically disordered as a monomer, retaining predominant disorder in a liquid-liquid phase-separated form. Disease mutations D290V and P298L induce aggregation by enhancing and extending, respectively, the aggregation-prone region. Granule components TDP-43 and TOG directly interact with and alter phase separation of hnRNPA2 LC. Arginine methylation reduces hnRNPA2 phase separation, disrupting arginine-mediated contacts. Additionally, generation of a C. elegans model of hnRNPA2-associated neurodegeneration is underway. These results highlight the mechanistic role of specific LC domain interactions and modifications conserved across many hnRNP family members but altered by aggregation-causing pathological mutations.
THE ART THAT IS PORTRAYED ON THE WALLS OF TATTOO SHOPS AND HOW IT INDICATES THE DIFFERENT LEVELS OF PAIN FELT WHILE GETTING A TATTOO

Jessica Sandler, BA

In a culture that is fixated on individualizing the human body, it is important to determine how to do this in a way that is easy and pain-free. Distractors reduce pain in self-report questionnaires completed by patients in hospitals (Barber & Cooper, 1972), and stimulating distractions like art are used to draw cognitions away from negative feelings (Drake & Winner, 2012). While there is research indicating that art is a positive distraction in medical facilities, it was proposed that art could serve this same purpose in other settings.

With the use of the Cold Pressor Task, it was hypothesized that if presented with pictures of tattoo shops filled with stimulating art and the sound of an electric tattoo needle, participants would have a higher pain threshold and endure more time with their hand in a bucket of ice water. It was also hypothesized that participants would have a lower pain threshold if presented with pictures of tattoo shops with less-stimulating art with the sound of the electric tattoo needle. This was a between-subjects design with 3 different groups. The voting group (VG) voted on the most- and least-stimulating images that were to be used in the study. The experimental group (EG) was exposed to an image of a tattoo shop with stimulating art. The control group (CG) was exposed to an image of a tattoo shop without stimulating art. Both the EG and CG were exposed to the sound of an electric tattoo needle buzzing. The VG had 6 participants, the EG had 8 participants, and the CG had 11 participants. 36.8% of the total participants had tattoos, 94.7% of the participants were white, and 78.9% were female. Participants were asked to submerge their dominant hand in a container of ice water and to look at an image projected on a screen. They were asked to notify the researcher at what moment they started feeling pain/discomfort. Participants were given a 2-minute time limit, and were prompted to remove their hand from the water when the pain was intolerable, or when the time limit was over. Participants were asked to rate the amount of pain they felt on a scale from 0-10, fill out demographic information, and include information from previous tattoo experience.

A one-way MANOVA was conducted, and there was not a statistically significant difference between the participants’ rating of pain felt, the time the participant noted that they first felt pain, and the total amount of time the participants had their hands in the ice water based the type of art they viewed, F(3,15)=.79, p>.05; Wilk’s λ=.86, partial η2=.14. An independent t-test was conducted, and there was not a statistically significant difference between male (M=0:01:36, SD=0:00:46) and female (M=0:01:11, SD=0:00:42) participants regarding at what time they removed their hands from the ice water, t(17)=1.07, p=0.30. Another independent t-test was conducted, and there was a statistically significant difference between male (M=0:00:21, SD=0:00:16) and female (M=0:00:06, SD=0:00:04) participants regarding the time that they first began to feel pain, t(17)=3.32, p=.004. A final independent t-test was conducted, and there was not a statistically significant difference between participants with (M=5.89, SD=3.03) and without (M=6.46, SD=1.27) tattoos regarding their ratings of pain felt during the experiment, t(17)=-.58, p=.57.

There were many limitations to this study, such that participants with previous tattoo experience knew the difference between the types of pain felt when doing the task compared to a real tattoo needle. Some participants looked around the room rather than at the photos. Additionally, the sound of the needle shifted in frequency which may have affected sensation/perception. Future research could be conducted with a larger sample size, and with the cooperation of various tattoo shops rather than simulating the feeling of getting a tattoo using the Cold Pressor Task.
BACKGROUND: Non-suicidal self-injury (NSSI) by cutting is a growing concern in adolescent populations. For example, self-injury by cutting has been shown to account for 25% of emergency department visits for self-harm annually for 7-24 years old. Recently, research has attempted to identify specific traits associated with self-injurious behaviors to improve prevention and treatment; one such trait is aggression. Higher levels of aggression have been seen in populations that self-injure, but little is known about specific populations that self-injure and their relation to aggression. We now present preliminary analyses examining reactive aggression via the Point Subtraction Aggression Paradigm (PSAP) in adolescents that self-injure by cutting in comparison to typically developing children (TDC).

METHOD: This study was IRB-approved at Bradley Hospital and Brown University. A total of n=29 youth, ages 10-16 years were enrolled. Participants were divided into two groups: (1) participants who self-injure by cutting (n=17) inclusion criteria were: cutting 1x in past month, at least 3x in past year, and greater than 5x in lifetime, with no prior suicide attempts; (2) TDC (n=12) inclusion criteria were: no lifetime history of psychiatric illness in participant or first-degree relatives. PSAP was used to provoke and assess reactive aggression in participants. Each participant was given three button options: (1) earns points; (2) steals points (aggressive response); (3) protects points from a fictitious opponent. Provocations were implemented by the fictitious opponent stealing points from the participant. All participants included in analyses reported successful deception post-task.

RESULTS: An ANCOVA was run to determine group differences in PSAP aggression while controlling for gender. Three group differences were found: (1) total number of aggressive responses [F(1,26) = 5.69, p = .03]; (2) number of aggressive responses relative to total number of responses [F(1,26) = 5.53, p = .03]; (3) number of aggressive responses relative to number of provocations [F(1,26) = 4.94, p = .04]. Post-hoc analyses revealed that children who self-injure by cutting have significantly less aggressive responses than TDCs.

CONCLUSIONS: This preliminary analysis suggests that children who engage in cutting exhibit fewer reactive aggressive responses when compared to TDCs. On further analysis, it is possible this aligns with past findings that negative self-talk, typical of MDD and GAD, mediates aggression and NSSI because our NSSI sample had high rates of Major Depressive Episode (MDD; 88%) and/or Generalize Anxiety Disorder (GAD; 65%). Further efforts to enroll the full planned sample (150 NSSI; 50 HC) are necessary to fully interpret this data. Additionally, using longitudinal data, we hope to add a third group in the analyses – children that self-injure by cutting and escalate to suicidal behaviors within 18 months. Nearly no comparative studies of children that self-injure and those that attempt suicide exist, which is important in identifying traits, such as aggression, that might identify adolescents that may be at increased risk for suicidal behaviors in the future.
GENDER ROLE CONFLICT AND NON-SUICIDAL SELF-INJURY

David Schillinger, BS, Margaret Andover, PhD

Gender role conflict (GRC) is a male-specific construct designed to examine the consequences that rigid masculine gender-norms can have on male-identified individuals, and has been associated with depression (Rice, 2013; Rodav, Levy, & Hamdan, 2014; O’Neil, 2015). Non-suicidal self-injury (NSSI) is the deliberate damage to one’s own body without suicidal intent, has also been associated with depression (Andover et al, 2005; Rodav et al, 2014). Both gender role conflict and non-suicidal self-injury have been shown to have significant relationships on several related variables. For example, anxiety has been found to be significantly correlated with both gender role conflict (O’Neil, 2015) and non-suicidal self-injury (Andover, Pepper, Ryabchenko, Orriko, & Gibb, 2005). Additionally, suicidal men have significantly higher levels of gender role conflict than non-suicidal men (Houle, Mishara, & Chagnon, 2008), and non-suicidal self-injury can act as a predictor of suicide (Guan, Fox, & Prinstein, 2012). However, the association between gender role conflict in men and non-suicidal self-injury has not yet been investigated. The purpose of this study was to examine the relationship between gender role conflict and non-suicidal self-injury, as well as to investigate depression as a mediator of the relationship between gender role conflict and non-suicidal self-injury. We hypothesize that gender role conflict will statistically predict non-suicidal self-injury frequency, and that this relationship will be mediated by depression.

The Gender Role Conflict Scale (GRCS; O’Neil, Helm, Gable, David, & Wrightsman, 1986) is a self-report measure that consists of 37 items measured on a six-point Likert-type scale, and was used to assess gender role conflict; the Inventory of Statements About Self-Injury (ISAS; Klonsky & Glenn, 2009; Klonsky & Olino, 2008) is a 39-item self-report measure used to assess non-suicidal self-injury across 12 behaviors and 13 functions, and was used to measure non-suicidal self-injury frequency; and the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a 21-question multiple-choice self-report measure assessing depressive symptoms that may have occurred during the preceding two-week period, and was used to measure depression severity.

The final sample consisted of 184 male participants from the United States who were recruited and completed a survey online. Since the Gender Role Conflict Scale is specific to men, only male-identified individuals were allowed to participate; there was 1 (0.5%) transgender female to male participant. Age ranged from 19 (n=3, 1.6%) to 68 (n=1, 0.5%), with an average age of 35.32 (SD=10.93). 94% (n=173) identified as heterosexual, 2.7% (n=5) identified as bisexual, and 3.3% (n=6) identified as homosexual. 57.1% (n= 105) of participants reported engaging in NSSI behaviors.

Gender role conflict statistically predicted NSSI frequency, B=6.11, SE(B)=3.03, t=2.48, p>.01. Additionally, the relationship between GRC and NSSI was mediated by depression. The indirect effect was B=.59, SE(B)=.37, CI(95%)=.06-1.59, and was thus statistically significant. The direct effect, B=1.26, SE(B)=.81, t=1.56, p=.12, was found to be insignificant. These results add to the growing body of literature demonstrating that the pressure to adhere to restrictive masculine gender norms can have a clear negative impact on men’s mental health, and can result in unhealthy and self-destructive coping behaviors. Additionally, these findings help elucidate some of the factors that may contribute to non-suicidal self-injurious behavior in men, and can potentially aid in the development of clinical interventions targeting this population. Further research is needed to examine more complex processes involving other variables related to non-suicidal self-injury, such as anxiety or suicide.
INVESTIGATING SOCIODEMOGRAPHIC VARIABLES AS PREDICTORS OF RETENTION AND ADHERENCE IN A LONGITUDINAL STUDY OF TEENS AND FAMILIES

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Background: From both a scientific and a public health standpoint, successful recruitment, retention, and engagement of “hard-to-reach” populations in clinical research is imperative; however, it can prove challenging. Researchers have identified several distinct barriers to their recruitment and retention as well as potential mitigating strategies. However, previous research has emphasized recruitment and sampling rather than challenges with adherence to study procedures and overall participant retention. Further, case reports in this field have favored randomized control trials (RCTs) or longitudinal studies with short follow ups. Few have investigated time-intensive longitudinal studies, or studies involving both adolescents and families as participants.

A previous investigation into sociodemographic predictors of retention within Project BEAR, a longitudinal study of adolescents and parents, only utilized demographic information collected from parents, and also only examined retention rate as a function of attending study follow-ups. Clearly, there is room to continue investigating the predictive value of teen sociodemographic information as relates to study compliance, and further, to consider the interplay of family sociodemographics in successful research.

Goals: Identify teen and parent sociodemographic predictors of retention, attrition, and compliance in Project BEAR, a longitudinal study of adolescents and parents that involves multiple time-consuming follow-ups. Investigate the predictive value of parent demographics and teen demographics on retention and adherence to study procedures. Examine representativeness of the study population and potential barriers/mitigating strategies to study retention and adherence.

Methods: Teen and Parent sociodemographic data, including age, gender, household income, household size, household makeup/marital status, race, and ethnicity were collected from 105 participant families in Project BEAR. Parent sociodemographic data was analyzed using logistic regression as potential predictors of retention rate for BEARs week 3 and month 6 follow-ups. Teen Sociodemographic variables were analyzed using linear and logistic regression as potential predictors of study adherence. Receipt of an EMA (Ecological Momentary Assessment) completion bonus at the w3 follow-up as well as the participants’ average daily EMA (ecological momentary assessment) completion rates were used as measures of study adherence.

Results: Results indicate that income level is a significant predictor of retention at the month 6 follow-up, but that socio-demographic variables are not significant predictors of study adherence.

Conclusion: Further research is needed to investigate retention barriers specific to low-income families as well as potential mitigating strategies. Additionally, given that demographic variables did not prove significant predictors of study adherence, further investigation is needed into what other variables (e.g. existing psychopathologies, individual motivation, or incentive strength) might prove to be significant predictors of participant compliance with EMA as well as study adherence more generally.
RACIAL AND ETHNIC DIFFERENCES IN MENTAL HEALTH SERVICE UTILIZATION IN SUICIDAL ADULTS: A NATIONALLY REPRESENTATIVE STUDY

Ana Sheehan, BA, Rachel Walsh, BS, and Richard T. Liu, PhD

The current study examines racial and ethnic differences in treatment utilization of mental health services in a nationally representative sample of suicidal adults. Data were extracted from the National Survey on Drug Use and Health (NSDUH) for the years 2009 to 2016. Participants consisted of adults with suicidal ideation and/or behavior in the past 12 months (n = approximately 2,700). Multivariate logistic regression analyses will be employed to assess racial/ethnic differences in mental health treatment utilization. Health insurance status, family income, age, sex, and depressive symptom severity will be included as covariates in all analyses. We hypothesize that racial/ethnic differences will emerge with regards to treatment utilization of mental health services for suicidal ideation and behaviors. More specifically, we predict lower rates of mental health treatment use among racial/ethnic minority populations across all levels of suicide severity (i.e., suicidal ideation, suicide plans, and suicide attempts), and across multiple levels of mental health services (i.e., outpatient and inpatient treatment).
COMPARISON OF PROPENSITY SCORE WEIGHTING METHODS FOR IMPROVING COVARIATE BALANCE

Dorothy Skierkowski-Foster, PhD; Ethan Moitra, PhD; Rich Jones, PhD

Propensity score methods have long been utilized to account for imbalance across important covariates in observational treatment studies. This study provides an overview of the various propensity score methods available to researchers, with an emphasis on 1:1 matching, inverse probability weighting (IPW), stabilized inverse probability weighting (sIPW), and matching weight (MW) methods. Data utilized in this example are derived from a longitudinal study of anxiety disorders among Whites, African Americans, and Latinos. Nineteen covariates were identified by the researchers as possible confounding variables at baseline, and standardized mean differences were calculated to assess imbalance across treatment groups prior to, and after, application of propensity-score weights. Weights were calculated for three subsets of the demographic dataset in which 1) minority status was collapsed across African American, Latino, and Other levels to create a binary race variable corresponding to 'White' and "Non-White"; 2) IPW and MW were calculated using a multinomial logistic regression framework, including individuals who identify as 'Other'; and 3) individuals who identified as 'Other' were excluded from the multinomial logistic regression model to calculate weights specific to Whites, African Americans, and Latinos.

Overall, matching weights derived from the binary logistic regression model (White, non-White) performed better than the IPW weights for this model. However, weights derived from the three-level multinomial logistic regression model (excluding those who endorsed the 'Other' racial group, and including only Whites, African Americans, and Latinos) demonstrated the best balance across all measured covariates, as compared with the two-level matching weights, and two- and three-level IPW models. Matching weights are an extension of IPW methods, and can be applied in settings with two or more groups. This method reweights exposed and unexposed groups to create a pseudo-population in which individuals are expected to exhibit better balance across observed covariates. Yoshida et al. (2017) recommend matching weights for comparing outcomes across groups, particularly when the event of interest is rare. Unlike IPW (which generates a weight for all subjects from 1 to infinity), and 1:1 matching methods without replacement (which limit the size of the dataset to observations with a definite match), matching weights generate a weight for all subjects in the dataset, with weights ranging from 0 to 1. Hence, data are not discarded (as with 1:1 matching), and observations with extremely high values are not likely to be influential (as is possible using IPW methods). This study provides a practical demonstration of the utility of matching weights as a method to correct for imbalance across an array of covariates, as compared with other commonly used propensity score methods.
The cognitive skills needed to successfully complete Trail Making Test Part B (TMT-B) may also be important for driving. The standard cut-off time of 300s for TMT-B limits clinical assessment and research analysis and creates a spuriously restricted range. The purpose of this study was to apply the TMT-B Efficiency Score (TMT-Be), which increases variability among those unable to complete the task in 300s, to a sample of older adults who also completed an on-the-road driving evaluation. Data were obtained from N=146 cognitively impaired and cognitively intact individuals in the Providence, Rhode Island area as part of a larger driving study. Of those with complete data (n=114), most (96.5%) were White, the average age was 74.9 years (SD=7.20), and most were female (58.8%). The correlation between TMT-B total time in seconds and global driving rating was significant, and as the time to completion for TMT-B increased (worse performance), worse driving scores were obtained (rs=0.456, p <0.001). Spearman’s correlations revealed significant associations between worse TMT-Be performance and worse driving rating scores (rs=0.474, p <0.001). Error types on TMT-B were also analyzed, and a significant correlation emerged such that perseveration errors were associated with worse driving ratings (rs=0.283, p= 0.002). Comparison of TBT-Be to another pro-rated scoring method (Heaton et al., 2004) revealed a significant correlation in the expected direction (rs=0.224, p=0.017). Overall, TMT-Be may be an important research tool that increased the variability among those unable to complete the task in 300s. Additional research and clinical applications of TMT-Be will be discussed.
Alcohol and cigarettes are commonly used together and greater than 80% of individuals with an alcohol use disorder (AUD) are also smokers. Attention bias is the tendency of our perception to be affected by our recurring thoughts and represents a key area of research in addiction psychiatry. However, current paradigms developed to assess attentional biases are limited to individual cues investigating the general processes rather than investigating how this process might be manifested in terms of selective attention. There exists a potentiation of attentional processing towards specific related cues, which escalates craving and use of the preferred substance. The aim of this pilot study is to develop a cue-reactivity (CR) paradigm in order to measure attentional bias in heavy-drinking smokers toward simultaneous neutral, alcohol and smoking cues.

Heavy drinking smokers were enrolled in a novel integrated CR paradigm in which participants act freely with multiple substances as a measure of attentional bias. Participants have their preferred alcohol, cigarette brand and water placed in front of them and are first asked to pick up and smell each substance, with later sessions allowing participants to choose which substances to interact with. Scoring is done by counting the number of interactions with each substance as well as the total time spent with each substance during the session in which they can act freely. A multiple regression analysis was conducted to examine the strength of the relationship between the time spent with either substance in the lab and the self-reported cravings measured by the Tobacco Craving Questionnaire and the Alcohol Craving Questionnaire.

In an interim analysis of 10 participants, alcohol interaction was more strongly positively related to alcohol craving \[*P=0.017, r^2 = 0.71\] than smoking craving \[*P=0.020, r^2 = 0.26\]. However, cigarette interaction in the lab was not significantly correlated with alcohol cravings or cigarette cravings \[P’s>0.5\]. The effect size for alcohol attention compared to the effect size for smoking attention indicates that the level of alcohol attention individuals experienced in the lab accounted for a large portion of the variability of overall craving.

These preliminary findings indicate that in alcoholic smokers, alcohol may be more responsible for the variability in craving than cigarettes, with cravings for alcohol driving behavior and attention in the lab. This is the first pilot study to link behavior and subjective preference for alcohol vs. cigarettes, which can pave priorities in therapeutics to treat individuals who suffer from alcohol-nicotine comorbidities.
OPIOID-SENSITIVE PERIAQUEDUCTAL GRAY TO VENTRAL TEGMENTAL AREA GABAERGIC PROJECTIONS ARE POTENTIATED BY LOW FREQUENCY STIMULATION

Robyn St. Laurent, BA; Tsuda, Ayumi; Kauer, Julie PhD

Plasticity in the reward circuitry of the brain is considered a critical initial step in the series of neural adaptations that lead to addiction. A midbrain structure, the ventral tegmental area (VTA), is a major source of dopamine in the brain. Through discrete mechanisms, all drugs of abuse share the same outcome of increasing dopamine release from the VTA. The VTA is comprised of a heterogenous population of dopamine-, GABA-, and glutamate- containing cells. Spontaneously active dopamine cells are tightly regulated by GABAergic inhibition from local interneurons and from GABAergic cell bodies originating outside of the VTA. Recently, the use of optogenetics for circuit dissection has revealed that plasticity at these GABAergic synapses is likely to be heterogeneously expressed across afferents. Thus the conventional electrical stimulation used in many prior reports likely resulted in some forms of plasticity to be missed while others are comprised of a mix of inputs with heterogeneous expression of plasticity mechanisms. We report here a form of long-term potentiation (LTP) at inhibitory synapses in the VTA that has not yet been described. This LTP is expressed at opioid-sensitive terminals originating from the periaqueductal gray.
CLINICIAN RATINGS OF VULNERABLE AND GRANDIOSE NARCISSISTIC FEATURES: IMPLICATIONS FOR AN EXPANDED NARCISSISTIC PERSONALITY DISORDER DIAGNOSIS

Kasey Stanton, MA, Mark Zimmerman, MD

Conceptualizations of narcissistic personality disorder (NPD) in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) have been criticized for focusing too exclusively on grandiose narcissistic traits (e.g., exploitativeness, entitlement) and failing to capture vulnerable narcissistic features (e.g., feelings of inadequacy). We extended prior grandiose and vulnerable narcissism research by examining the degree to which clinician ratings of traits related to grandiosity overlapped with traits related to vulnerability in a large sample of adult outpatients (N = 2,149). We also examined relations with other psychopathology and psychosocial impairment for both (a) narcissistic trait configurations including both vulnerable and grandiose features and (b) configurations focusing on grandiose narcissistic traits. Structural results indicated that some personality features related to vulnerability (e.g., perfectionism, inadequacy) were unrelated to ratings of grandiose narcissistic personality features. Additionally, our results suggest that emphasizing vulnerable features within narcissism trait configurations may increase NPD’s overlap with other disorders (e.g., borderline PD, social anxiety) and does not appear to discriminate pathological narcissism from antisocial PD, a disorder with which DSM-5 Section II NPD is highly comorbid. Finally, scores on configurations defined only by grandiose narcissistic traits related positively to all psychosocial impairment indicators, although configurations also including vulnerable features generally showed stronger relations with psychosocial impairment. The implications of these findings in regard to future conceptualizations of NPD are discussed.
Ectopic spiking, in which action potentials originate far distal to the axon initial segment and travel retrogradely, was first observed in the 1970s in neurons projecting to seizure-generating foci. More recently they have been observed in hippocampal and neocortical neurons after the cell has been stimulated to fire hundreds of orthodromic spikes. Little is known about the origin, functional effects, and distribution of this phenomenon in different cell populations and brain areas. In acutely prepared slices of the mouse orbitofrontal cortex (OFC), we observe ectopic spikes in a great majority of interneurons, with particularly high prevalence in parvalbumin-expressing interneurons (PV+ cells). This class often exhibits persistent barrages of these ectopic spikes that last for seconds and can reach frequencies above 150 Hz. In contrast, somatostatin-expressing interneurons in OFC rarely exhibit more than a few scattered ectopic spikes given comparable stimulation. Barrages of ectopic spikes were also observed in most parvalbumin-expressing interneurons in somatosensory cortex. Given PV+ cells’ strong inhibition of pyramidal cells and role in shaping gamma rhythms, and the role of OFC gamma rhythms in cognitive flexibility, ectopic spiking may have implications for computation, network activity, and cognitive processing.
During nervous system development, growing axons are guided to their targets by a combination of attractive and repulsive cues. These cues can be presented as gradients of diffusible factors or as cell surface- and extracellular matrix-attached molecules, and they are often produced by guidepost cells, which are positioned at intermediate targets or boundaries of the axonal trajectory and serve as choice points. The full repertoire of axon guidance cues and receptors and the identity of the tissues producing these cues remain to be elucidated. The meninges are connective tissue layers enveloping the vertebrate brain and spinal cord that serve to protect the central nervous system (CNS). The meninges also instruct nervous system development by regulating the generation and migration of neural progenitors, but it has not been determined whether they help guide axons to their targets. Here, we investigate a possible role for the meninges in neuronal wiring. Using mouse neural tissue explants, we show that developing spinal cord meninges produce secreted attractive and repulsive cues that can guide multiple types of axons in vitro. We find that motor and sensory neurons, which project axons across the CNS-peripheral nervous system (PNS) boundary, are attracted by meninges. Conversely, axons of both ipsi- and contralaterally projecting dorsal spinal cord interneurons are repelled by meninges. The responses of these axonal populations to the meninges are consistent with their trajectories relative to meninges in vivo, suggesting that meningeal guidance factors contribute to nervous system wiring and control which axons are able to traverse the CNS-PNS boundary.
ANALYSIS OF PARTICIPANT FEEDBACK FOLLOWING COMPLETION OF A NOVEL PERINATAL WALKING PROGRAM

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Background: Depression symptom elevations are common during pregnancy, yet for a variety of reasons, many women do not access standard forms of mental health care. Physical activity interventions may have potential to improve mood symptoms in this population, and may also be associated with other health benefits. In light of the lack research in this area, Battle and colleagues (2015) developed a novel intervention designed to safely and gradually increase activity levels among distressed pregnant women with low activity levels. The Prenatal Walking Program (PWP) is a 10-week pedometer-based walking intervention for depressed pregnant women. Participation entails wearing a small step-counter to track daily activity and attending brief biweekly sessions with an interventionist to obtain support in gradually increasing daily activity over the course of pregnancy. An open pilot trial was conducted to assess acceptability, feasibility and preliminary efficacy of PWP; the current study entails analysis of qualitative comments obtained from program completers, to clarify participants’ perspectives on the intervention in more depth.

Methods: Twenty depressed pregnant women enrolled in an open trial aimed at testing the feasibility and acceptability of the Prenatal Walking Program. All were able to obtain medical clearance to participate from their prenatal care provider. Seventeen of the 20 women enrolled (85%) completed at least half of intervention sessions; 14 women (70%) attended every session. Fifteen women (75%) shared comments regarding the PWP during exit interviews that were recorded and transcribed. A thematic analysis was conducted to identify perceived benefits of the program, in addition to challenges and suggestions for further refining PWP.

Results: Analysis of participants’ narrative responses indicated that women in the program described largely positive experiences in the PWP intervention. Reported benefits from the program included: increased motivation to exercise; increased awareness regarding activity levels; enjoyment from walking; symptom improvement, including better sleep and improved mood; and increased confidence and self-esteem. Some challenges reported were that the walking goals were sometimes overwhelming and walking became more difficult as pregnancy progressed.

Conclusions: A gentle walking intervention appears to be an acceptable and feasible intervention to address antenatal depression. In addition, benefits reported by participants who completed an exit interview were not limited to improvements in mood. To more definitively evaluate efficacy, the PWP intervention is currently being examined in the context of a larger NIH funded randomized controlled trial.
Background: Chronic back pain is a leading cause of disability in the United States. The treatment options have remained unchanged in the past 10 years and there is a great need for new and innovative treatments for pain management. Mind-body interventions are one of the most promising approaches to chronic pain. One such treatment, mindfulness, focuses on increasing awareness and acceptance of moment-to-moment experiences, including physical discomfort and difficult emotions.

Methods: In this study, we examined the brain mechanisms by which mindfulness-based interventions may exert its beneficial effects in chronic back pain. To this end, we proposed to investigate the neurobiology and effectivity of mindfulness-based treatments in chronic pain patients by recording EEG and functional MRI data, alongside disability rating scales. We hypothesized that brain electrophysiology (EEG) and functional connectivity (fMRI) will change in predictable ways in those who respond to mindfulness with reduced pain-related impairment and less pain bothersomeness. Veterans were enrolled in eight weekly 90-minute Mindfulness-Based Care for Chronic Pain (MBCP) sessions focusing on didactic material about mindfulness and techniques to increase awareness of body sensations and emotions (e.g., body scan and mindful movement). Participants were administered clinical assessments at baseline, midpoint, and endpoint visits, as well as at one-, three-, and six-month follow-up appointments.

Results: Preliminary data analysis indicates that the mindfulness course improved the Veterans’ pain bothersomeness level (p = 0.04, Bothersomeness scale) and improved the level of developed mindfulness (p = 0.035, FFMQ scale) at the one-month follow-up time point.

Conclusion: Our preliminary results pointed to long term benefit of Mind-Body interventions in Veterans with chronic back pain. This is very promising given the financial and emotional burden of chronic pain and lack of alternative treatments. At our next step, we are going to study changes in brain circuitry (assessed via EEG and fMRI) associated with clinical improvement. The goal is to use insights from biological data to refine and individualize mind-body interventions.
FAMILY-PROVIDER COLLABORATION, ASTHMA KNOWLEDGE, AND ADHERENCE: SOCIODEMOGRAPHIC DIFFERENCES IN LATINO, BLACK, AND NON-LATINO WHITE FAMILIES

Alayna Tackett, PhD, Michael Farrow, MA, Sheryl J. Kopel, MSc, & Elizabeth L. McQuaid, PhD, ABPP

Rationale: Asthma disproportionately impacts youth from racial/minority backgrounds (CDC, 2017). Improving patient-provider partnerships by promoting engagement through communication, shared decision-making, and discussion of self-management has recently been emphasized (AHRQ, 2017). The present study sought to examine racial/ethnic differences in family asthma management among early adolescent youth.

Methods: Youth aged 12-14 years (N = 92; Mage= 13.8 years; SD= .6; 60% male; non-Latino White (NLW) = 40%; Black/African American (BLK) = 25%; Latino = 35%) and their caregivers completed semi-structured interviews (Family Asthma Management System Scale (FAMSS); McQuaid et al., 2005) related to asthma management. Latino families were more likely to be living at or below the poverty line (75%) relative to NLW (22%) and BLK (39%) families (X2 = 20.16, p < .001). ANOVA models were used to explore potential ethnic group differences in asthma management.

Results: Racial/ethnic differences were observed in a number of management variables, including Asthma Knowledge (F (2, 85) = 4.91, p=.01), Provider Collaboration (F (2, 86) = 4.52, p=.01), Symptom Assessment (F (2, 85) = 5.36, p=.006) and Adherence (F (2, 85) = 6.06, p< .01). Post-hoc comparisons (Tukey HSD) indicated that Adherence, Asthma Knowledge, and Symptom Assessment were higher for NLW relative to BLK families (Adherence, Mdifference= 1.74; p< .01; Asthma Knowledge, Mdifference= 1.23; p< .001; Symptom Assessment, Mdifference= 1.17; p< .01). Provider Collaboration was higher among NLW (Mdifference= 1.09; p=.01 and Latino families (Mdifference=.93; p=.05) relative to BLK families. Effect sizes were moderate (η2=.10 - .12). Differences in adherence as a function of family-provider collaboration indicated that BLK families maintained relatively low adherence despite minimal increases in collaboration. NLW and Latino families showed increased adherence as collaboration improved. Bootstrapped mediational analyses to further explore these relationships were nonsignificant.

Conclusions: In this sample, racial/ethnic differences were not found on elements of asthma management including Response to Symptoms, Environmental Control and Balanced Integration of Asthma/Family Life. Some key differences emerged. BLK families had lower asthma knowledge, experienced lower levels of collaboration with treatment providers, and had lower medication adherence. Despite reports of family-provider collaboration, BLK families maintained relatively low levels of adherence. NLW and Latino families exhibited increased adherence as family-provider collaboration increased, highlighting the role of the patient-provider partnership among these groups. Future research is needed to elucidate socio-cultural factors that may influence the relationships between race/ethnicity, patient-centered care, and health-related outcomes.

Funding: K24HD058794 (McQuaid, PI), NICHD; Hassenfeld Child Health Innovation Institute, Childhood Asthma Research Innovation Program
A BRIEF SURVEY TO IDENTIFY PRIORITIES FOR IMPROVING SEXUAL AND REPRODUCTIVE HEALTHCARE FOR YOUNG WOMEN OF COLOR

Sneha Thamotharan, PhD, Brittany Wickham, BA, Kelsey Bala, BA, and Christopher Houck, PhD

Background. Black and Latina girls (young women of color) are heavily burdened by poor sexual and reproductive health outcomes. Previous research has identified provider-level factors that are operative in healthcare disparities including bias, prejudice and stereotyping. These factors may then influence provider’s interactions with minority patients, and as a result, minority patients perceptions of healthcare and their health. However, little information exists on whether these factors are present in the provision of sexual and reproductive care of young women of color.

Methods. A sequential multilevel mixed-methods needs assessment was conducted with providers and young women of color. The present abstract presents data from the quantitative phase, which included survey methods to quantify needs and barriers to quality sexual and reproductive healthcare.

Results. Providers. All providers (n=24) indicated that they would like additional training in providing healthcare to young women of color, including more training in communication and providing developmentally appropriate services. Additionally, 83% of providers reported a low explicit bias (m=35.37, range 25-53, out of a possible score of 125). This reflects little perceived bias against Blacks and Latinos. However, performance on the Implicit Associations Task (IAT) revealed that 67% and 54% demonstrated an unconscious pro-White/anti-Black and pro-White/anti-Latino bias, respectively. And 54% of providers indicated having moderate attitudinal barriers to addressing sexual health with patients. Young women of color. The majority (79%) of young women of color reported going to a doctor for their healthcare. However, the majority (79%) also felt their doctor was not at all to only somewhat knowledgeable and informed about their cultural background. Further, one-third of young women of color reported not feeling like their doctor was trained to treat individuals with their racial background and not feeling comfortable talking to their provider about sex. Roughly half of the young women felt their doctor did not care about them as a person and indicated having a future preference for a provider of the same racial background.

Conclusions. The discrepancy between explicit and implicit bias suggests that a majority of providers lack self-awareness with regard to their own biases. However, all providers appeared to recognize a lack of training and the need for additional training in providing quality sexual and reproductive healthcare to young women of color. These barriers appear to reflect in young women of color’s perception of their sexual and reproductive healthcare, including perceiving low knowledge, competence, comfort, and warmth. The results highlight inadequate medical training and the need for more training in preparing providers to provide culturally and gender responsive care -- care that respects the diversity of young women and considers factors that can affect their health and healthcare experience.
Identification of youth in the early stages of psychosis is critically important, as early intervention is linked to better long-term outcomes and untreated psychosis is associated with poor prognostic factors. Given that many individuals with psychosis report receiving mental health services for a range of psychopathology during adolescence and prior to the onset of full-threshold psychosis, risk screening within pediatric mental health settings is an important step in identifying youth with risk symptoms as early as possible. This study investigated several approaches to psychosis-spectrum screening among adolescents on the psychiatric inpatient unit at Bradley Hospital. The screening methods evaluated include: 1) the PRIME Screen, an established measure of psychosis-risk symptom severity, 2) the Thought Problems scale of the Youth Self-Report (YSR) form from the Achenbach System of Empirically Based Assessment, a scale designed to measure strange thinking linked to multiple psychiatric disorders, and 3) a newly created psychosis-spectrum risk scale comprised of eight items from the YSR that are commonly associated with psychosis. Screening scores were compared to interview-based psychosis assessment (the psychosis module of the Children’s Interview for Psychiatric Syndromes) to investigate the ability of each approach to identify youth experiencing clinically significant psychosis-related symptoms. Preliminary results suggest that within this acute setting, there is a need for psychosis-spectrum evaluation, and the PRIME Screen and YSR psychosis-spectrum risk scale may be valid screens for psychosis symptomatology. Results from this study will inform psychosis-spectrum screening among psychiatrically hospitalized adolescents, which may in turn facilitate monitoring and treatment for emerging symptoms of psychosis.
BEHAVIORAL ACTIVATION THERAPY DURING DAILY TRANSCRANIAL MAGNETIC STIMULATION IN THE TREATMENT OF MAJOR DEPRESSIVE DISORDER

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Background: Behavioral Activation (BA) therapy and Transcranial Magnetic Stimulation (TMS) have each been shown to be effective in the treatment of adult outpatients with major depressive disorder (MDD). Combining both treatments may produce synergistic antidepressant outcomes.

Methods: A new protocol (“BA+TMS”) for incorporating a simplified version of BA during a standard 6-week course of TMS was developed and pilot tested in 11 consecutively treated outpatients with treatment resistant depression (TRD). A modified BA intervention was integrated with routine patient-staff interactions during daily TMS sessions. Engagement in BA was measured by tracking the setting and attainment of between-session "goals" during the course of TMS. Serial administration of standard self-report scales was used to measure overall symptom improvement.

Results: Pilot data was collected for 14 weeks during which n=11 female TRD patients (median age 52) received treatment. The average number of goals set per participant was 18 with an average goal completion rate of 77%. Six (55%) patients met criteria for response to TMS (≥ 50% change in baseline to endpoint scores Inventory of Depressive Symptoms-Self Report (IDS-SR) and Patient Health Questionnaire (PHQ-9) scores). Integration of the BA+TMS protocol was associated with a mean decrease in depression scale total scores of 46.9% and 54.5%. An anhedonia scale showed a 39.2% decrease. Mean endpoint IDS-SR, PHQ-9 and in the Snaith-Hamilton Pleasure Scale (SHAPS) were significantly lower than the baseline scores, indicating overall symptom improvement following BA+TMS (one-sample t-test, p<0.001 respectively). Percent goal completion correlated positively, but not significantly, with percent change in SHAPS, IDS-SR, and PHQ-9 (0.27, 0.29, and 0.41 respectively, all p>.05).

Conclusion: Incorporation of a modified version of BA therapy into a standard acute course of TMS therapy is feasible and holds potential for augmenting the efficacy of treatment for patients with TRD. A controlled trial is warranted to confirm the combined BA +TMS protocol is more efficacious than TMS alone.
RELIABILITY OF CARDIORESPIRATORY MEASURES OF AUTONOMIC REGULATION: IMPLICATIONS FOR RESEARCH ON AUTISM SPECTRUM DISORDERS

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Research findings of altered autonomic nervous system responses in children with autism spectrum disorder (ASD) have been inconsistent (Benevides & Lane, 2015), and these variable findings may be attributable to both methodological design and individual participant characteristics. Nonetheless, physiologic indicators of autonomic function such as heart rate variability are considered promising measures for biomarker development in ASDs. Demonstration of test-retest reliability is lacking for these measures and is needed to support measurement development. The primary objective of this study was to investigate the test-retest reliability of heart rate (HR) and heart rate variability, specifically respiratory sinus arrhythmia (RSA), a measure of autonomic (parasympathetic) activity, in a sample of preschool children with and without ASD. As part of a larger study, 15 individuals, 4 children with ASD and 11 typically developing children participated in the retest reliability study (age range 2–6; M= 4.8 years, SD= 1.0, 87% male). Children with ASD were recruited from multiple sources, including the Rhode Island Consortium for Autism Research. Children with typically development were also recruited. The main study protocol included two visits to the Brown Center for the Study of Children at Risk. The first visit was dedicated to administering a global developmental evaluation of cognitive, language, and functional ability using a number of published psychological assessments. The second visit included an experimental procedure designed to capture physiological regulation in response to various tasks. ECG was acquired at 1 kHz with a small device which was placed on the child’s chest for the duration of the visit and the digitized ECG data was saved to a computer and aligned with video records for later analysis. The ECG recording procedure included two baseline measures and then a series of episodes designed to elicit frustration by interrupting engagement with the experimenter and toys to varying degrees (11 episodes). The participants in this reliability sub-study returned to the center within two weeks of their second visit, at which time the physiology protocol was repeated. Reliability of the resulting HR and RSA measures from physiology sessions 1 and 2 was tested using intra-class correlations and by examining mean differences between sessions. Analyses were run on the HR and RSA values from all 11 task episodes at times 1 and 2: baseline (2), engagement (3), social frustration (3), and non-social frustration (3). Results indicated high stability and reliability of HR and RSA measures across the experimental tasks. For the HR estimates, the two baseline periods had high reliability (ICC’s = .90 & .91). For the remaining 9 tasks, ICC’s ranged from .68 to .92, and 8 of 9 tasks had ICC’s > .80. For the RSA estimates, the two baseline periods also had high reliability (ICC’s = .93 & .88). For the remaining 9 tasks, ICC’s ranged from .84 to .94, and all of the 9 tasks had ICC’s > .80. Repeated measures ANOVAs revealed significant interactions between time and condition on mean HR and RSA. Physiological response to social engagement was evident at both times points; however, the effect was attenuated at time 2. Similarly, results suggest a smaller magnitude of change in HR and RSA from baseline to the different frustration tasks at time 2. The high intra-class correlation coefficients reported demonstrate that HR and RSA can be reliability measured during tightly designed observational contexts. As a result, research using heart rate variability as a tool may be useful for studying short term treatment effects in ASD and other pediatric populations. The pattern of change in HR and RSA over time during specific tasks highlights the need to take into account memory and learning when measuring these physiologic indicators during closely spaced follow up sessions.
PRELIMINARY ANALYSIS FOR CORRELATION BETWEEN OXYTOCIN AND ENDOGENOUS STRESS AND OPIOID HORMONES IN ALCOHOLIC SMokers

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RATIONALE
There is no approved treatment for dual alcohol/nicotine dependencies. Conditions based on stress-induced drinking and smoking exist. Elements of stress-motivated actions include the anti-stress oxytocin hormone and the endogenous opioid system.

OBJECTIVE
The remarkable co-existence of opiocortin and Corticotropin Releasing Factor immunoreactive CRF-IR projections surrounding the ventricular system in the central nervous system (CNS), suggests a mutual interaction between the opioid and the stress system. Also, as with oxytocin, B-endorphin is found in the hypothalamus and pituitary gland, and serves as endogenous ligand of the B-opioid receptor (same receptor as for exogenous opioids). Among the neuropeptides involved in stress response, we evaluated orexin, which regulates the release of noradrenaline, Substance P, a key responder to preserve biological integrity, and neurotensin, for its neuroleptic properties.

METHODS
We performed a pilot study with 20 patients with alcohol use disorder to investigate the relationship between oxytocin, the opioid system (B-endorphin) and stress hormones (orexin, neurotensin and substance P). We constructed correlation matrices for oxytocin and check for multicollinearity indices among a number of other variables of that may affect alcohol and cigarette related behaviors (craving and consumption). All pairwise comparisons were conducted with a Bonferroni correction.

RESULTS
The strong positive correlation that we found between oxytocin and B-endorphin [r=0.742, n=20, ***p <.001] with an addictive disorder provides us with human evidence of an association between oxytocin and mechanisms involving opioid peptides. Oxytocin levels had a statistically significant correlation with: cotinine [r=.656, n=17, **p <.01], neurotensin [r=0.742, n=20, ***p <.001], orexin [r=0.830, n=18, ***p <.001], and substance P [r=0.715, n=20, ***p <.001].

CONCLUSION
Overall, these overlapping neuroendocrine results support the idea that investigating the effects of oxytocin treatment on stress-induced alcohol-, smoking- and drug-seeking in addicted individuals is warranted to evaluate the direction of this association.
BROWN’S NIMH-FUNDED R25 GRANT TO SUPPORT PSYCHIATRY RESIDENT RESEARCH TRAINING: OVERVIEW AND 2017-2018 UPDATE

Audrey Tyrka, MD, PhD, Noah Philip, MD, Sara Vargas, PhD, Tracey Guthrie, MD

In 2013, Brown University’s Department of Psychiatry and Human Behavior was awarded an R25 grant from the National Institute of Mental Health to support research training of our psychiatry residents. This grant has substantially increased opportunities for our residents to conduct high-quality, cutting-edge research to prepare them for successful careers as physician-scientists in psychiatry and neuroscience. The R25 provides residents with intensive research training at a critical point in their careers, with the goal of increasing the number and preparedness of psychiatrists who conduct innovative research in translational, basic, or clinical areas.

The R25 combines an intensive longitudinal mentored research experience with an individualized research-focused didactic curriculum and career development activities. Residents have 10% protected time for research in their first and second years, 33% protected time in the third year, and 80% protected time in the fourth year. R25 activities are integrated with Brown’s four-year residency program so that R25 residents meet all ACMGE and American Board of Psychiatry and Neurology requirements.

R25 residents are mentored by outstanding faculty who are conducting innovative research and are carefully matched with residents’ specific research interests. This poster highlights the key components of the R25 program and provides an update on the R25 residents’ research projects and accomplishments.

R25 residents have been very productive in terms of publications and presentations, have received support to attend and present their findings at national conferences, and have received numerous travel, poster, and other research awards.

In summary, our NIMH-funded R25 grant has substantially enhanced our residents’ research training experience by capitalizing on the support provided by the grant, high-caliber research mentorship, and strong institutional support at Brown. Institutional prioritization of psychiatry and brain science, our department’s cross-disciplinary collaborations, and our faculty’s productivity and longstanding commitment to research mentoring are ensuring that our residents have an exceptional research training experience.
HATHA YOGA FOR CHRONIC PAIN IN PATIENTS RECEIVING METHADONE MAINTENANCE TREATMENT: A PILOT STUDY

Donnell Van Noppen, BA, Lisa Uebelacker, PhD, Genie Bailey, MD, Ana Abrantes, PhD, Michael Stein, MD

Purpose: Chronic pain is a significant problem for many people receiving opioid agonist treatment for opioid use disorder. We adapted existing yoga programs for chronic pain and conducted a pilot RCT to assess acceptability and feasibility in people enrolled in methadone maintenance.

Methods: We conducted a pilot RCT of 12 weeks of yoga (n=10) compared to a health education contact control (n=10). The yoga was adapted from existing yoga programs for pain, so was gentle and chair-based with a focus on breathing exercises and slow meditative movements. We compared results to a priori benchmarks for feasibility and acceptability.

Results: We recruited 20 participants in 6.5 months, meeting our target recruitment rate. Ninety percent of participants completed an endpoint assessment. There were no serious adverse events related to study participation. Self-report measures of credibility, acceptability, and satisfaction exceeded pre-set cut-offs for both arms. Participants who attended more than one yoga class reported practicing yoga at home at least twice per week for at least 75% of the weeks for which they provided data. The only benchmark we did not meet was class attendance. Although rates improved over time as we made modifications, only 5 of 10 people assigned to yoga attended 7 classes or more (of 12 possible). We examined reasons for poor attendance. One person was jailed right after randomization, one experienced a severe pain exacerbation before attending classes, and one had ongoing health problems including influenza and gastrointestinal distress. Finally, two participants expressed fear that yoga might increase pain rather than help.

Conclusion: Yoga seems acceptable, and is readily adopted by some people with chronic pain who are taking methadone. However, health problems, justice system involvement, and fear of pain may interfere with participation. Next steps include a consideration of ways to address the problem of fear of pain in this population, particularly for those with more severe pain symptoms at baseline. The pilot is currently being repeated with people in buprenorphine treatment before expanding to a fully powered randomized clinical trial.
ENHANCED CLINICAL UTILITY OF THE MODIFIED MINI MENTAL STATE EXAMINATION COMPARED TO THE MMSE IN OLDER ADULTS WITH MILD COGNITIVE IMPAIRMENT

Ryan Van Patten, MS; Karysa Britton, BS; Geoffrey Tremont, PhD

OBJECTIVE: To demonstrate enhanced clinical utility of the Modified Mini-Mental State Examination (3MS) as compared to the original Mini-Mental State Examination (MMSE) in older adults with mild cognitive impairment (MCI).

PARTICIPANTS AND METHODS: 247 older adults (65.60% amnestic MCI [aMCI] and 34.40% nonamnestic MCI [naMCI]), aged 51-94 (M age = 74.59 [7.84]; M years of education = 14.06 [3.06]), and 96.40% Caucasian. Participants completed the MMSE, 3MS, and a comprehensive neuropsychological battery at a hospital-based clinic in the northeastern U.S.

RESULTS: As expected, the 3MS exhibited a greater range of scores (68-99) than the MMSE (24-30). Moreover, compared to age-corrected normative data, 45.7% of our MCI participants scored at the 16th percentile or lower (1 SD below the mean) on the 3MS, while only 13.1% of participants scored at the 16th percentile or lower on the MMSE. Finally, we conducted partial correlations (controlling for age and education) between these two screening measures and composite metrics of the following neuropsychological domains: processing speed/attention, language, visuospatial abilities, memory, and executive functioning. In every case, the 3MS explained more variance in neuropsychological performance than the MMSE. The largest difference occurred in the language composite, where the MMSE accounted for only 4.5% of the variance in language performance, while the 3MS accounted for 21.1% of variance. These results did not differ by MCI subtype.

CONCLUSION: The 3MS appears to be a significant improvement over the MMSE in an MCI population. It has a greater range of scores, it exhibits greater sensitivity to MCI, and it explains more variance in neuropsychological performance than the MMSE. While not a replacement for comprehensive neuropsychological examinations, the current data support the utility of the 3MS as an initial cognitive screening instrument. Future research should compare the performance of the 3MS against other cognitive screening tests such as the Montreal Cognitive Assessment.
PUBLIC KNOWLEDGE OF LATE-LIFE COGNITIVE DECLINE AND DEMENTIA IN AN INTERNATIONAL SAMPLE

Ryan Van Patten, MS, Geoffrey Tremont, PhD

BACKGROUND: Dementia prevalence is increasing on a global scale. Assessing and enhancing public knowledge of age-related pathological cognitive decline may improve prevention efforts, early presentation for clinical evaluation/treatment, and care for the afflicted. No study to date has included a full-length, psychometrically-sound measure of dementia knowledge, covering multiple domains in a large, diverse, global sample. The current study represents such an effort.

METHODS: Participants were 3,619 adults recruited through Amazon’s Mechanical Turk – an online software platform that allows researcher access to >100,000 potential participants from >100 countries. Participants completed a 44-item survey, including the validated Dementia Knowledge Assessment Scale.

RESULTS: Individuals from the U.S. and Canada performed best on the DKAS, followed by those from Europe and Mexico/South/Central America, then Africa and India. The U.S., Canadian, and European groups scored significantly higher than the Indian and African groups and these differences were not explained by educational attainment. Effect sizes were largest in the areas of dementia causes/characteristics and communication/engagement, and smaller in the areas of knowledge of risk/health promotion and patient care needs. Additionally, those a) with a family member diagnosed with dementia, b) who had completed a dementia education course, and c) who are dementia healthcare providers, all performed better than those without these characteristics. Finally, significant misconceptions were present in chronic traumatic encephalopathy (CTE), subjective cognitive decline (SCD), and cognitive sequelae of Parkinson’s disease (PD). In contrast, quiz performance was high for items relating to the cognitive benefits of exercise, dementia and driving, and patient care needs.

CONCLUSIONS: Results revealed significant sociodemographic differences in overall knowledge of dementia. Moreover, knowledge gaps emerged in cause/characteristics and communication/engagement, as well as CTE, SCD, and PD. We contend that our findings lay the groundwork for effective global dementia education initiatives by providing specific recommendations as to which sociodemographic populations and knowledge domains benefit the most from limited resources. Given the lack of current effective therapies for neurodegenerative diseases, the resultant knowledge enhancements provide the best avenue for delaying onset of disease and improving quality of life for people with dementia.
Suicide rates have increased over the past several decades. While a considerable amount of research has focused on risk factors for suicidal behavior, much of this work does not adequately differentiate between risk factors for suicidal ideation (SI) and suicide attempts, a distinction important in identifying risk for these related but distinct clinical outcomes. Furthermore, research on first-onset SI separately from recurrent ideation, phenomena that presumably have separate underlying mechanisms. The goal of this study is to identify risk factors for first-onset SI among a high-risk group: individuals receiving treatment for substance use disorders. Data were drawn from the National Treatment Improvement Evaluation Study, a prospective study examining the impact of addiction treatment programs. Patients with no lifetime history of suicide attempts or ideation (n=2,560) were assessed at baseline, and at a one-year follow-up for prospectively occurring SI. Sociodemographic variables, mental health indices, substance use severity indicators, and history of partner or spousal abuse were evaluated as prospective predictors of first-onset SI in linear regression models. Current mental health problems (OR = 1.54, 95% CI = 1.19 – 2.01), current substance use problems (OR = 1.33, 95% CI = 1.04 – 1.70), and difficulty obtaining treatment for substance use problems (OR = 1.90, 95% CI = 1.16 – 3.11) emerged as significant predictors of first-onset SI in a multivariate analysis. These findings suggest that individuals struggling with current symptoms, either mental health or substance-use related, are among the most at risk for developing SI. Furthermore, barriers to treatment also predicted first-onset SI, highlighting the importance of improving treatment accessibility. Future clinical work and research would benefit by addressing these issues, potentially by focusing on mental health treatment in substance abuse programs and problem solving ways to remove barriers to treatment.
CONCURRENT ANTIDEPRESSANT USE IS NOT ASSOCIATED WITH DIFFERENT rTMS TREATMENT OUTCOMES FOR MAJOR DEPRESSIVE DISORDER IN A SHAM-CONTROLLED TRIAL

Haizhi Wang, MD, Linda Carpenter, MD, Scott, Aaronson MD, Gregory Clarke MD, Paul Holtzheimer MD, Clark Johnson MD, William Mcdonald MD, Elizabeth Stannard, Bret Schneider MD

Backgrounds: Repetitive Transcranial Magnetic Stimulation (rTMS) is an effective treatment for patients with major depressive disorder (MDD) who do not respond to, or are unable to tolerate pharmacological treatments. The large regulatory controlled clinical trials establishing TMS efficacy prohibited concurrent use of psychotropic medications. Few studies have examined the effect of concurrent medication on rTMS outcomes.

Methods: A randomized, double-blind, sham-controlled trial examined the efficacy of 2-coil TMS in MDD subjects who were allowed to continue stable doses of their prior medications (n=92) (Carpenter et al 2017). 20 daily rTMS treatment were delivered at 10 Hz (maximum summated power for both coils <=120% of motor threshold) with coil centers positioned over left dorsolateral prefrontal cortex (dlPFC) and dorsomedial prefrontal cortex (dmPFC).

Results: In the intention-to-treat (ITT) sample (n=92), concurrent antidepressant use (all pharmacological classes combined) was not a significant predictor of response (p=0.6) or remission(p=0.6); results were similar for the per-protocol sample (n=75). Among those who received active stimulation (n=47), no category of concurrent medication except opioid analgesic use was a significant predictor. Concurrent opioid use during rTMS predicted inferior outcome at trend level (p<0.10).

Conclusions: rTMS treatment outcome was not contingent on, or accounted for, by concurrent antidepressant use in this controlled trial, refuting the notion of synergistic effect from medication plus stimulation.
IMPACT OF YOGA VERSUS HEALTH EDUCATION ON RISK AND RESILIENCE IN MAJOR DEPRESSIVE DISORDER

Jessica West, MA, Lisa Uebelacker, PhD

Research has shown that yoga may be an effective adjunctive treatment for persistent depression, the benefits of which may accumulate over time, with effects seen during the follow up period after yoga intervention. The objective of this secondary analysis was to evaluate whether yoga may also attenuate risk factors for onset and maintenance of new depressive episodes (rumination) as well as increase resilience factors for shortening ongoing episodes and preventing onset of new episodes (mindfulness) among a sample of persistently depressed individuals. One-hundred-twenty-two individuals were recruited into an RCT comparing yoga with a health education class, rumination and mindfulness were assessed at baseline and across 3 time points. Findings indicate that yoga may be effective at increasing the observe facet of mindfulness relative to the control group and indicate that there may be a difference in the rate of change in acting with awareness, with individuals assigned to yoga showing greater increases over time. Results suggest some benefits of yoga may be gained early on and maintained while others may emerge over time. Severity of depression may influence how much an individual is able to gain from yoga intervention. Lack of follow up assessments of rumination and mindfulness after study intervention period may contribute to limited findings.
ENHANCING HEALTH AMONG YOUTH LIVING WITH HIV USING AN IPHONE GAME

Laura Whiteley, MD, Larry K. Brown MD, Leandro Mena MD, Lacey Craker MPH, Trisha Arnold PhD

Objectives: Despite promising outcomes of antiretroviral therapy (ART), challenges to improving adherence among youth living with HIV (YLWH) exist. Mobile games are popular among youth and may improve skills related to resilience, coping, and ART adherence. This study examines the preliminary effects of an iPhone game/app on ART adherence, viral load, and relevant knowledge and attitudes among YLWH in Jackson, MS.

Methods: A RCT with 61 YLWH tested the impact of BattleViro, an ART-related iPhone game, over 16 weeks. Participants, ages 14-26, were recruited from HIV clinics and randomly assigned to receive BattleViro or a non-HIV-related game. All participants received a medication monitoring device. Chi-square and t-test analyses examined baseline differences between conditions. Continuous outcomes were examined using analyses of covariance (ANCOVAs) controlling for baseline scores. Cohen's d effect size differences (ESD) between groups were calculated.

Results: The sample was 79% male, 97% Black, and 74% non-heterosexual, with a mean age of 22 years. A third had started ART in the past 3 months and the self-reported mental health symptoms from the Brief Symptom Inventory (BSI) was low to moderate. There were no demographic differences between conditions. Examination of ESDs revealed that BattleViro demonstrated promising, but nonsignificant, improvements in HIV knowledge (ESD=0.50), ART knowledge (ESD=0.42) and social support (ESD=0.62). Exploratory moderation analyses revealed interactions between BattleViro and newly starting ART. Those newly starting ART in the BattleViro condition, compared to those in the control, experienced a 0.96 log greater decrease in viral load (ESD=-2.21, F=4.33, p=0.04), better adherence (71% vs 48%; ESD=1.15, F=3.90, p=0.05), more HIV knowledge (ESD=0.90), and more ART knowledge (ESD=0.72). BSI scores were unrelated to outcomes.

Conclusion: BattleViro showed promising improvements in HIV knowledge, ART knowledge and social support. Also, there was improved adherence and viral load outcomes specifically among those newly starting ART. ART initiation may be an opportunity to empower and motivate YLWH to build healthy skills, even in the face of stress and mental health symptoms.
Intracortical brain-computer interfaces (iBCIs) use neural activity to directly control external devices, bypassing damaged neural pathways with the aim of restoring communication and independence for people with impaired mobility due to stroke, spinal cord injury, or neurodegenerative disorders. Premotor cortex is a promising candidate for iBCI applications given its combination of prominent corticospinal projections coupled with strong links to frontal and parietal areas involved in sensory-motor transformations. Using an instructed delay task with both auditory and visual cues, we examined single unit activity in the human middle frontal gyrus (MFG) and precentral gyrus (PCG) of a person with cervical spinal cord injury using chronically implanted microelectrode arrays. We found that information related to target direction contained in MFG was highly dependent on the sensory modality used to instruct the movement. MFG, unlike PCG, was strongly biased towards encoding information presented as goal-relevant auditory cues, rather than visual cues. Our results suggest that MFG may be specifically involved in interpreting auditory cues for the purpose of movement guidance.
SELECTIVE ATTENTION PREDICTS CHOICE BEHAVIOR IN HEAVY DRINKING SMOKERS

James Wilmott, BA, Rachel Souza ScB, Joo-Hyun Song PhD, Carolina Haass-Koffler PharmD

As much as 80% of alcohol-use disorder (AUD) patients smoke cigarettes. Attentional bias is preferential processing of information due to recurring thoughts and is a developing area of research in addiction psychiatry. Current approaches to studying the role of attentional bias in addiction use individual cues (alcohol or cigarettes) in isolation. These paradigms reveal there is a potentiation of attention to specific related cues that escalates cravings and use of the preferred substance. However, drinking smokers often encounter cues simultaneously. It is not yet known how attentional bias might manifest as selective attention when in the presence of multiple cues. We developed a noninvasive behavioral paradigm to determine selective attention in response to simultaneous alcohol and cigarette cues in heavy drinking smokers. This integrated cue-reactivity and eye tracking paradigm allowed us to measure selective attention in two ways: 1) via cravings in response to real alcohol and cigarettes (cue-reactivity), and 2) via gaze behavior when viewing pictures of alcohol and cigarettes (eye tracking). Preliminary results of the cue-reactivity paradigm are reported elsewhere (Souza et al., 2018). Our eye tracking task assessed selective attention by measuring volitional control of gaze when exposed to simultaneous cues. Each participant observed pictures of their self-reported favorite alcohol and cigarette items as well as a neutral (e.g., glass of water) item. Crucially, they were asked to treat the items as if they were real (that is, not pictures on a screen) and choose the one they preferred. Proportion of trials choosing each cue varied across participants, revealing individual differences in preference strength. The average proportion of time spent looking at the chosen item in a trial was significantly greater than unchosen items. This pattern occurred regardless of whether the alcohol or cigarette item was chosen. However, proportion of looking time at each item did not differ when the neutral item was chosen. Taken together, these results reveal that selective attention is predictive of choice when heavy drinking smokers choose between alcohol and cigarettes.
EMOTION REGULATION: ACROSS THE LIFESPAN AND THROUGHOUT MINDFULNESS

Dorothy Yam, ScB, Kristina Eichel, PhD & Willoughby Britton, PhD

Mood disorders such as depression and anxiety have a large impact on our society, affected about a fifth of people in the United States in recent years. One central facet that characterizes these mood disorders is the lack of emotion regulation skills one has to cope with their debilitating episodes. Prominent theories in psychology, though, including the Motivational Theory of Lifespan Development (MTLD) and the Socioemotional Selectivity Theory (SST), outline that one's age predicts their emotion regulation skills, with older people being better at emotion regulation than their younger counterparts. There's also a rapidly growing interest in the concept of mindfulness as a tool for wellbeing, hence the growing interest in using it clinically. But too little is known about who it affects, how, and why it affects them, and more research needs to be done before this can "enter the clinical sphere." Mindfulness-based interventions (MBIs) specifically designed to target one's depression and has some promising results—but not for everybody. This research on emotion regulation looks to find more specificity in treatment, engaging with emotion regulation (measured in validated questionnaire tests with extensive sub-scales) and age as variables that moderate outcomes of ameliorating depression levels after an 8-week MBI course.
AMYOTROPHIC LATERAL SCLEROSIS (ALS) results in the selective degeneration of motor neurons. Approximately 20% of familial ALS (fALS) cases result from mutations in superoxide dismutase 1 (SOD1), an enzyme that catalyzes the breakdown of superoxide radicals. Although decades of research have advanced our understanding of the role of SOD1 in fALS, the mechanisms behind motor neuron degeneration remain unclear. Identifying suppressors should provide insight into the molecular mechanisms underlying the selective degeneration of motor neurons in SOD1 ALS models. We are undertaking a classical forward genetic screen to identify suppressors of glutamatergic neuron degeneration observed in a knock-in SOD-1G85R model. Our lab has generated knock-in models for SOD1 patients alleles using MosSCI-mediated homologous recombination. One of the patient alleles is a G85R mutation, which converts a glycine to arginine at position 85. The SOD-1G85R knock-in mutant animals exhibit neurodegeneration in glutamatergic neurons after stress. Using EMS, we randomly mutagenized SOD-1G85R mutant animals and then screened roughly 5000 F2 lines for suppression of neurodegeneration after exposure to stress. We identified suppressor lines and are using whole genome sequencing to identify candidate genes. Once candidate genes are identified, we will further characterize the genes by assessing cholinergic motor neuron death, neuromuscular function, and survival. Additionally, to determine if common pathways underlie neurodegeneration in fALS, we will test candidate and established ALS suppressor genes in other SOD1 and fALS models. Understanding the suppressors in fALS models may lead to the development of treatments and illuminate some of the molecular mechanisms behind ALS. Support for this project was provided by ALS Finding a Cure.
FAMILY STRESS AS A MODERATOR OF INTERNALIZING SYMPTOMS IN CHILDREN WITH SERIOUS MENTAL ILLNESS

Mona Yaptangco, PhD, Katharine E. Musella, Teresa M. Preddy, PhD, Stephanie H. Parade, PhD, & Anne S. Walters, PhD

Mental health problems affect nearly one in five children and are a growing public health concern, with common diagnoses including depression and anxiety. Partial hospitalization programs are a multidisciplinary, family focused treatment for children with serious mental illness that often target these diagnoses. In this study, we examined the effectiveness of the program on child reported anxiety and depressive symptoms and focus on family factors that moderate these outcomes.

Method: Data was collected from archival clinical data between 2014 to 2017 and included 289 participants between ages seven to 13. Child reported depressive (Child Depression Inventory-2) and anxiety (Screen for Child Anxiety Related Disorders) symptoms were obtained at admission and discharge, while demographic information and measures of parental stress and support (Family Check-up) were collected at admission. Results: Child reported symptoms of anxiety and depression significantly decreased from admission to discharge. Insurance type and the child’s gender emerged as factors that predicted treatment outcomes. Where children with private insurance reported significant decreases in depressive symptoms while children with state funded insurance did not report significant. Furthermore, females reported sharper decreases in depressive symptoms from admission to discharge compared to males. Results also indicate family stressors in the past month significantly predict change in symptoms of depression. Specifically, children in families with no stressors occurring in the past month reported sharper declines in overall depressive symptoms compared to children in families who reported one or more stressors in the past month. There were no significant findings when examining family support as a moderator. Conclusion: This study suggests that this partial hospitalization program may be effective in treating internalizing symptoms in young children and that the experience of recent family stressors may moderate this effect. This study emphasizes the importance assessing for recent family stressors, rather than primarily family supports, when treating children and their families within a partial hospitalization setting. Further implications will be discussed.
THE EFFECT OF PREVIOUS ECT TREATMENT ON RESPONSIVENESS OF MDD PATIENTS TO rTMS

Shiwen Yuan, MD, Eric Tirrell, Nicole Desrochers, A. Polly Gobin, Linda L. Carpenter

Background
Patients with major depressive disorder (MDD) who receive ECT and subsequently relapse often seek TMS as a less-invasive treatment option. Data are lacking regarding the effect of previous ECT on responsiveness to TMS treatment.

Methods
Data from n=235 MDD patients treated with rTMS at our TMS Clinic were retrospectively analyzed. IDS-SR and PHQ-9 depression scales were administered at the start and end of treatment. Baseline features and rTMS outcomes (response, remission, percent change) were compared for groups based on past history of ECT or none. Linear regression models examined predictors of positive outcome.

Results
There were no significant group differences in age, gender, treatment number, or duration of treatment course. Significantly more +ECT patients had past psychiatric hospitalization (94% vs. 53%, p<0.001) and there were trends toward higher depression severity at baseline for +ECT group (IDS-SR p=0.065; PHQ-9 p=0.055).
No significant group differences were found in post-treatment scores or in %change on either scale. Response (38% vs. 49% p=0.09) and remission (18% vs. 28%; p=0.06) rates tended to be lower for +ECT patients using IDSSR but not PHQ-9. When all variables (ECT, age, gender, past hospitalization, baseline scores, number treatments, number of weeks) were entered in regression models, ECT did not significantly predict responder or remitter status. Fewer number of sessions (p=.003) and more treatment weeks (p=.027) predicted better outcomes for +ECT patients.

Conclusions
Patients with past ECT were more depressed and had (trend-level) lower response rates, but in general, ECT history does not significantly predict rTMS outcome.
MACHINE LEARNING PREDICTS CLINICAL RESPONSE TO TRANSCRANIAL MAGNETIC STIMULATION: A RESTING STATE ELECTROENCEPHALOGRAPHY STUDY

Amin Zandvakili, MD, PhD, Noah S Philip MD, Stephanie R Jones PhD, Audrey R Tyrka MD, PhD, Benjamin D Greenberg MD, PhD, Linda L Carpenter MD

BACKGROUND: Repetitive transcranial magnetic stimulation (TMS) is clinically effective for major depressive disorder (MDD) and investigational for other conditions including posttraumatic stress disorder (PTSD). Understanding mechanisms of TMS action and developing biomarkers predicting response remain important goals.

HYPOTHESIS: We applied a combination of machine learning and electroencephalography (EEG), testing whether machine learning analysis of EEG coherence would 1) predict clinical outcomes in individuals with comorbid MDD and PTSD, and 2) determine whether an individual had received a TMS course.

METHODS: We collected resting-state 8-channel EEG before and after TMS (5Hz to the left dorsolateral prefrontal cortex, 3000 pulses/session, up to 40 sessions). We used machine learning (Lasso regression and Support Vector Machine, SVM) to test the hypothesis that baseline EEG coherence predicted the outcome and to assess if EEG coherence changed after TMS.

RESULTS: Clinical response to TMS were predictable based on pretreatment EEG coherence (n = 29). For MDD, sensitivity was 61.54%, and specificity was 81.25%. For PTSD, sensitivity was 50.00% and specificity, 82.35%. Area under the ROC curve was 0.832 for reduction in MDD symptoms and 0.711 for reduction in PTSD symptoms. SVM classifier was able to accurately assign EEG recordings to pre- and post-TMS treatment. The accuracy for Alpha, Beta, Theta and Delta bands was 75%, 77%, 74% and 79% respectively.

CONCLUSIONS: Machine learning successfully predicted non-response to TMS with high specificity, and identified pre- and post-TMS status using EEG coherence. This approach may provide mechanistic insights and may also become a clinically useful screening tool for TMS candidates.
FUSIFORM FACE AREA ACTIVATION USING A FACE PARADIGM IN A P300 SPELLER

Alyssa Zisk, MS, Kunal Mankodiya, Bahram Borgheai, and Yalda Shahriari

The P300 speller is a brain computer interface designed to allow communication for people with significant movement impairments. It takes advantage of neural responses to rare or unexpected events for communication purposes. The 26 letters of the alphabet, along with 10 other commands which may include digits or spaces, are placed in a 6x6 matrix. Rows and columns of the matrix are intensified together, and subjects are asked to attend to the intensification of their target character or command by counting these intensifications. Electroencephalogram response data is collected from the subject during this process, allowing a program to determine whether or not any given intensification included the target character.

A variety of methods have been proposed in order to improve detection of target intensifications, thereby reducing both the number of intensifications required to recognize a command and the rate of incorrect command selections. These methods include the use of additional electrodes beyond the typically recorded Fz, Pz, and Cz locations [1]. There is some evidence that expanded channel sets including posterior electrodes may improve classification accuracy. Alternatives to the usual character "flashing," where rows or columns of grey characters are briefly turned white, can also be used to increase responses and improve detection. Paradigms involving movement, such as rotation, as well as replacement of characters with images of faces, have been compared favorably to the standard flashing paradigm [2].

In the current experiment, a rotation paradigm and a face paradigm are tested. In the rotation paradigm, the characters in a row or column are simultaneously flashed and rotated 90 degrees clockwise as an intensification. In the face paradigm, the characters in the intensified row or column are instead replaced with images of a face. In addition, EEG data was collected from 16 channels: Af3, Af4, Fz, F3, F4, Cz, T7, T8, Pz, P3, P4, P7, P8, Oz, O1, and O2. This includes electrodes in the posterior area as well as electrodes near the fusiform face area.

Both experimental paradigms showed activation in posterior areas, where the visual cortex is located. Across subjects and electrodes, activations were greater in response to images of faces than to the rotation and color change. In addition, while using the face paradigm, channels Af3, Af4, F3, Fz, and F4 showed notable responses. These channels are located near the fusiform face area, which is known to be involved in facial processing. This activation in the fusiform face area was the strongest P300 response detected in the experiment, both in terms of absolute level of response and in terms of correlation between EEG activity and the target characters status as intensified or unintensified. For this reason, we recommend the use of the face paradigm and electrodes near the fusiform face area, such as to improve P300 system performance.

References