22.

Increasing breastfeeding rates with financial incentives among Puerto Rican mothers in Philadelphia

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Background: Low-income Puerto Rican mothers in the U.S. present the median breastfeeding duration of 2 weeks. Although peer support has shown an advantage to increase breastfeeding rates, there is room for improvement to motivate and support Puerto Rican mothers in the U.S. for continued breastfeeding.
Objective: To examine whether home-based, professional and peer breastfeeding support combined with monthly financial incentives on observed breastfeeding or pumping increase breastfeeding rates at 1 and 3 months postpartum.
Design/Methods: All participants (N = 36) were Puerto Rican mothers living in Philadelphia and received supplemental nutritional services from a local Women, Infants, and Children (WIC) program. A bilingual lactation consultant and peer support were provided in home-based settings as requested for all participants, and half of them were randomized to also receive monthly financial incentives on observed breastfeeding or pumping for 6 months following delivery. The incentive amount has increased every month from $20 to $70 so as to encourage continued breastfeeding for 6 months.
Results: The breastfeeding rates were 89% in the incentive condition (n = 18) versus 44% in the professional and peer support only condition (n = 18) at 1-month (p = 0.01); 89% versus 17% at 3-month (p < .0001); 78% vs 0% at 6-month (p < .0001).
Conclusions: Monthly financial incentives that systematically increase the magnitude may help Puerto Rican mothers continue breastfeeding for 6 months. Many report struggles to continue breastfeeding and pumping as they go back to work and are hesitant to breastfeed or pump in public places.

23.

Participation rates and outcomes for systolic heart failure patients in cardiac rehabilitation

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Purpose: Exercise training has been shown to reduce combined cardiovascular mortality and hospitalizations in patients with chronic heart failure with reduced ejection fraction (HFrEF). Whereas there is extensive data on exercise training for individuals with HFrEF in a research setting, the experience of delivering cardiac rehabilitation (CR) services in the clinical setting has not been well described. With little known regarding the number of qualifying HFrEF patients in the U.S., we describe our 18-month experience recruiting hospitalized inpatients and stable outpatients into Phase 2 CR.
Methods: Patients hospitalized with HFrEF were tracked for enrollment in CR. Exercise training response was described for patients identified as inpatients and for stable HFrEF outpatients referred from cardiology clinic or heart failure clinic.

Results: The cohort included 83 patients hospitalized with HFrEF and 36 outpatients. Only 17% (14/83) of eligible inpatients enrolled in CR following HFrEF hospitalization compared to 35/36 (97%) outpatient referrals. Improvements in aerobic capacity for the total cohort were observed whether expressed as estimated METs (n=19, 4.6±1.6 to 6.2±2.4, p<0.0001) or VO_{2peak} (n=14, 14.4±3.5 to 16.4±4.6 mL*kg^{-1}*min^{-1}) (p=0.02) for those who completed CR.
Conclusion: Significant barriers to recruiting and enrolling patients with HFrEF were observed and only 17% of inpatients attended CR. Systematic in-hospital referral with close follow-up in the outpatient setting has the potential to capture more eligible patients. The participation of referred stable outpatients with HFrEF was much higher. Regardless of referral source, HFrEF patients completing CR can expect improvements in aerobic capacity, muscle strength, and depressive symptoms.

24.

Is adolescence a sensitive period for housing mobility effects on substance use?

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Neighborhood context may be one upstream cause of adolescent substance use, but extant observational research may be biased. Developmental theories suggest that intervening early in life to change detrimental exposures could improve outcomes. Leveraging a unique experimental design, we test 1) how neighborhood and housing changes affect adolescent substance use, and 2) whether the child's gender and age when the family moved into better neighborhoods modifies treatment effects. We use the Moving to Opportunity (MTO) study, which randomly assigned volunteer families to 1 of 3 treatment groups (1994-1997): a low poverty group receiving a Section 8 rental voucher redeemable in low-poverty neighborhoods and housing counseling; a Section 8 group receiving a traditional voucher; and public housing control group. Our outcome was a count of the number of different substances (alcohol, cigarettes, marijuana, other drugs) used in the past month (measured in 2002, N=2829). We combined the two voucher groups because effects were homogenous (p>.05). There was a 3-way interaction among treatment, gender, and baseline age for the number of different substance used (p=.001). Treatment boys 9y or older were more likely (p<.05) than controls to use a wider variety of substances, while boys <9y had no treatment effect. Conversely, treatment girls older than 9y were less likely than controls to use a wider variety of substances (p<.05), while girls <9y had no treatment effect. This suggests the need to incorporate additional supports for families of teenage boys who receive rental vouchers, to buffer adverse consequences of moving at older ages.

25.

Delay discounting of pregnancy- and condom-protected sex among methadone-maintained women

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Over 80% of pregnancies are unintended among women with opioid use disorder (OUD), and use of effective contraception is uncommon in this population. Initiating effective contraception is effortful and involves delays, first to obtain the method from a provider, followed by consistent use for a period of time before becoming effective. The delays involved in becoming protected by highly effective

contraceptives may underlie their lack of use by women with OUD, as this population has been shown to be hypersensitive to delays for acquiring money and condom-protected sexual intercourse. The present study was designed to evaluate a novel tool for measuring how delays to pregnancy protection affect self-reported likelihood to engage in protected vs. unprotected sexual intercourse. Participants were women aged 18 and older who were receiving medication-assisted treatment for OUD and were not intending to become pregnant in the next 6 months. Participants completed the Barratt Impulsiveness Scale (BIS), a Monetary Choice Questionnaire (MCQ), the Condom-Discounting Task (CDT), and the novel Pregnancy-Discounting Task (PDT). Preference for condom- and pregnancy-protected sex declined orderly as a function of delay. Furthermore, preference shifted toward immediate, unprotected sex at shorter delays for more desirable partners and for partners who participants deemed less risky for sexually-transmitted infections or pregnancy. These findings replicate prior research on delay discounting of condom-protected sex, and extend the findings to pregnancy-protected sex. Delays to achieving pregnancy protection appear to increase the likelihood of engaging in unprotected sex among women with OUD.

26.
The effects of prior stress on anxiety-like responding to intra-BNST pituitary adenylate cyclase activating polypeptide (PACAP) in male and female rats.

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Chronic or repeated exposure to stressful stimuli can result in several maladaptive consequences, including increased anxiety-like behaviors and altered peptide expression in anxiety-related brain structures. Among these structures, the bed nucleus of the stria terminalis (BNST) has been implicated in emotional behaviors as well as regulation of hypothalamic-pituitary-adrenal (HPA) axis activity. In male rodents, chronic variate stress (CVS) has been shown to increase BNST pituitary adenylate cyclase activating polypeptide (PACAP) and its cognate PAC1 receptor transcript, and BNST PACAP signaling may mediate the maladaptive changes associated with chronic stress. Here, we examined whether chronic variate stress (CVS) would sensitize the behavioral and/or endocrine response to a subthreshold BNST PACAP infusion. Male and cycling female rats were exposed to a 7 day CVS paradigm previously shown to upregulate BNST PAC1 receptor transcripts; control rats were not stressed. 24 hr following the last stressor, rats were bilaterally infused into the BNST with 0.5 µg PACAP. We found an increase in startle amplitude and plasma corticosterone levels 30 minutes following intra-BNST PACAP infusion in male rats that had been previously exposed to CVS. CVS did not enhance the startle response in cycling females. Equimolar infusion of the VPAC1/2 receptor ligand vasoactive intestinal polypeptide (VIP) had no effect on plasma corticosterone levels even in previously stressed male rats. These results suggest that repeated exposure to stressors may differentially alter the neural circuits underlying the behavioral and endocrine responses to intra-BNST PACAP and may result in different anxiety-like responses in males and females.

27.

Comparing depression and anxiety scores within a population of surgical vs nonsurgical lower socioeconomic cardiac patients.

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Introduction: Heart disease is one of the leading causes of morbidity and mortality in the United States. Patients treated surgically are more likely to experience higher levels of depression and anxiety than patients treated non-surgically. Higher levels of anxiety and depression can increase mortality and morbidity rates following a cardiac event. Lower-socioeconomic status (SES) patients are also more likely to suffer from anxiety and depression. However, little research has been done on the relationship between depression and anxiety to treatment modality within lower-SES cardiac patients.
Methods: Lower-SES patients who experienced a cardiac event were recruited for an incentives based study aiming to increase cardiac rehabilitation (CR) participation. During their initial CR session the ASEBA (a normed self-report measure for adaptive functioning and problems) was administered to all patients. The DSM-oriented subscales regarding depressive and anxiety problems as well as the combined anxious/depressed syndrome scale were examined in their relation to clinical and demographic characteristics.
Results: 94 subjects have completed the intake ASEBA thus far. Of those 94 subjects, 24% were surgical patients. When looking at the combined anxious/depressed scale, 72% of the total sample was considered to be within the average range, 15% was considered to be within the borderline range, and 13% was considered to be within the clinical range. When comparing the anxious/depressed scale by gender, we found that the females in our sample were more likely to be anxious/depressed than the males. No statistically significant differences were found based on treatment modality.
Conclusion: This high-risk population of lower-SES cardiac patients showed significant levels of clinically concerning anxiety and depression. High rates of clinical symptoms may explain lack of significant differences between treatment modalities. Additionally, lower-SES women facing recovery from acute cardiac events may be struggling more in terms of anxiety/depression than their male counterparts.

28.
Vermont culture of wellness initiative for people living with severe mental illness

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Research shows that the life expectancy of those with severe mental illness (SMI) is significantly shorter than the general population. In the United States, the life expectancy of someone with SMI is approximately 53 years compared to 78 years for the general population. One factor in this difference is chronic disease burden. Compared to the general population, obesity, diabetes and hypertension are 2-3 times higher in those with SMI, and the rate of smoking is 3-4 times higher. While smoking has declined significantly

in the general population in the last few decades, it remains stubbornly high among individuals with SMI.

In Vermont, the vast majority of people living with SMI are cared for at community mental health centers. In partnership with the centers, the Vermont Department of Mental Health has developed a Culture of Wellness initiative to address the higher prevalence of chronic disease. Using the Culture of Wellness guidance, participating centers will implement health promotion and illness prevention measures to reverse this troubling trend of higher morbidity and mortality. The project includes a whole-person approach to wellness, smoking cessation, improved diet, regular exercise and better management of prescription medications for treatment of psychiatric illness, which also contribute to the chronic disease burden. We will present the comorbidity data that drove development of this project, demonstrating the significant difference between the general population and those with SMI. We will also include outcomes data from model health promotion and illness prevention programs we have used to guide development of this initiative.

29.
Teen and parent dysregulation in teens with cannabis use disorders: Characteristics and behavioral treatment outcomes

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Greater dysregulation in youth and parents has been associated with poor clinical outcomes. This study explored teen and parent dysregulation in a sample of teens with cannabis use disorders (CUDs) to (1)identify associations of teen and parent dysregulation with CUD severity, family/social environment, and co---occurring psychopathology and (2)examine teen and parent dysregulation as moderators of CUD treatment outcomes. Teens with CUDs (n=153, Mage=15.79, Male=89%) participating in a 3---arm RCT of a family--- based behavioral intervention completed assessments at baseline pre---randomization and at end of treatment. At baseline, greater CUD severity (more problems from use, younger initiation age, increased CUD---dependence), poorer family/social environment (greater peer delinquency/pressure, poorer parent---teen relationship) and greater likelihood of co---occurring psychopathology were associated with greater teen dysregulation ($p's$<.05). More impaired parenting and greater likelihood of teen conduct/oppositional defiant disorder were associated with greater parent dysregulation ($p's$<.05). Examining treatment outcomes, an interaction between teen and parent dysregulation was associated with changes in frequency of use and probability of negative urine screens during treatment ($p's$<.05). Dyads with greater dysregulation in parent and teen were most likely to respond poorly across treatments. Dyads with teens higher in dysregulation, but parents lower, benefited the most across treatments, even compared to dyads with lower teen dysregulation (regardless of higher or lower parent dysregulation). Dysregulation in teens and parents might serve as important indicators of CUD severity, and moreover, the likelihood of response to behavioral treatment for CUDs. Research is needed to examine treatments for teen CUDs tailored on and directly targeting parent---teen dysregulation.

30.
Depression screeners in cardiac rehabilitation: Diversity, validity, and comparative utility

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Introduction: Depression screeners are tools used to initially identify individuals who may have a depressive disorder. Within cardiac populations, beyond identifying at risk patients, depression screeners have also been used to characterize populations, study groupings of risk factors, and predict both how likely a person is to complete a cardiac rehabilitation program (CR) as well as predict how much they will improve during the program.
Methods: The literature was reviewed to examine which depression screeners have been commonly used in CR and what purposes they served. Additionally, screeners were compared on their validity within the population of interest as well as how various screeners performed when compared directly. Data collected from the last 5 years at the University of Vermont Medical Center (UVMMC) directly comparing the Geriatric Depression Scale (GDS) and the Patient Health Questionnaire (PHQ-9) were also examined.
Results: In the literature the PHQ-9 and the BDI-II consistently outperformed other commonly used depression screeners (HADS-D, GDS, CES-D). Within UVMMC both the PHQ-9 and the GDS were significantly correlated (rs = .08-.38) with sex, age, incoming fitness, sessions attended, body composition, SES, and quality of life. Correlations were generally higher with the PHQ-9.
Discussion: While a variety of depression screeners are available for use in the CR setting some appear to perform better than others. Both the PHQ-9 and the BDI-II perform well both at identifying patients at risk for depression as well as at predicting patients who may be at risk for premature drop out from a program. CR programs should adopt a depression screener to identify patients in need of further psychosocial support as well as those who may need more general support to fully benefit from the program.

31.
Relationship between clinically significant health events and self-perceptions of Executive Function

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Introduction: Executive functions (EF), encompassing the behavioral and cognitive processes necessary for decision-making and behavior regulation, are affected by stress. However, the relationship between EF and life-threatening health events (and associated stress) is unknown. The Vermont Center on Behavior and Health (VCBH), an interdisciplinary group investigating behavior and risk for chronic disease, is uniquely suited to examine this relationship.
Methods: A common assessment battery across VCBH studies includes measures of EF performance (Delis-Kaplan Executive Function System, D-KEFS; Delay Discounting Task, DDT; Stop Signal Task, SST) and perception

(Behavior Rating Inventory of Executive Function, BRIEF). Overall Health Status (HS) is assessed using the European Quality of Life questionnaire (EQoL). After controlling for IQ, age, and sex data was analyzed from adults whose study participation was either triggered by a recent, life-threatening health event (RHE; breast cancer, a cardiac event, or peripheral arterial disease) or not (CTRL; gestational weight gain or family psychopathology).

Results: RHE reported significantly more problems with EF than CTRL, though there were no corresponding group differences in performance. HS, which was significantly worse in RHE than CTRL, was correlated with perceived EF deficits in the sample overall. Furthermore, HS accounted for more of the variance in BRIEF scores than EF performance. Discussion: Understanding how a recent, clinically significant health event can impact decision-making and EF may help us to design more successful interventions to promote healthy behavior change. This study supports the hypothesis that coping with the stress of a recent health event may impact how an individual thinks about their decision-making abilities regardless of their level of functioning.

32.
Does parental executive function moderate the relationships between household food insecurity, diet quality, and child psychiatric symptoms?

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Objectives: The present study examines the relationships between household food insecurity (HFS) and child psychiatric problems and diet quality and investigates the ways in which parental behavior and cognition may serve as risk or protective factors for children in food-insecure households.

Methods: A total of 70 families, containing three members and at least one child between the ages of 7 and 17 years, participated in the study. The US Department of Agriculture Household Food Security Survey, CBCL/6–18, and Behavior Rating Inventory of Executive Function–Adult Version (BRIEF-A) were used to measure HFS during the past 12 months, child psychiatric symptoms, and parent executive functioning (EF), respectively. Diet quality was assessed by 24-hour food recall. Multiple ANCOVA and linear regression analyses were performed in SPSS, version 22.

Results: After controlling for socioeconomic status (SES), there was an independent effect of HFS on scores on the attention (ATT) and somatic (SOM) CBCL subscales, with children in food-secure households showing fewer problems. There was an independent effect of HFS on daily calorie, fat, and protein intake, with children in households with low food security consuming more than children in households that were either food secure or had very low food security. There was also a significant interaction effect of HFS and SES on scores on ATT, thought problems (TP), and anxious-depressed (A/D) subscales. There was a significant moderating effect of parental EF on the relationship between HFS and child psychiatric symptoms. Parental emotional control significantly attenuated children's A/D symptoms and had a marginally significant effect on SOM, TP, and ATT problems. Parental scores in self-monitoring, initiating, and planning/organizing domains also had marginally significant, attenuating effects on the relationship between HFS and A/D symptoms.

Conclusions: These findings support previous work that suggests that HFS is associated with diet quality and child

mental health. These results suggest that parents' EF skills may moderate the association between HFS and child psychiatric symptoms, particularly anxiety/depression. However, these skills do not seem to influence the child's diet quality. Further research is needed to refine the specific mechanisms by which certain domains of parental EF may protect children in food-insecure households from negative psychiatric outcomes and assess the efficacy of interventions designed to enhance these skills.

33.
Health-related behaviors and mortality outcomes in women diagnosed with ductal carcinoma in situ

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Purpose. Women diagnosed with ductal carcinoma in situ (DCIS) of the breast are at greater risk of dying from cardiovascular disease and other causes than from breast cancer, yet associations between health-related behaviors and mortality outcomes after DCIS have not been well studied.

Methods. We examined the association of body mass index, physical activity, alcohol consumption, and smoking with mortality among 1,925 women with DCIS in the Wisconsin In Situ Cohort study. Behaviors were self-reported through baseline interviews and up to three follow-up questionnaires. Cox proportional hazards regression was used to estimate hazard ratios (HR) and 95% confidence intervals (CI) for mortality after DCIS, with adjustment for patient socio-demographic, comorbidity, and treatment factors.

Results. Over a mean of 6.7 years of follow-up, 196 deaths occurred. All-cause mortality was elevated among women who were current smokers one year prior to diagnosis (HR=2.17 [95% CI: 1.48, 3.18] vs. never smokers) and reduced among women with greater physical activity levels prior to diagnosis (HR=0.55 [95% CI: 0.35, 0.87] for ≥5 hours per week vs. no activity). Moderate levels of post-diagnosis physical activity were associated with reduced all-cause mortality (HR=0.31 [95% CI: 0.14, 0.68] for 2-5 hours per week vs. no activity). Cancer-specific mortality was elevated among smokers and cardiovascular disease mortality decreased with increasing physical activity levels.

Conclusions. There are numerous associations between health-related behaviors and mortality outcomes after a DCIS diagnosis.

Implications for Cancer Survivors. Women diagnosed with DCIS should be aware that their health-related behaviors are associated with mortality outcomes.

34.

A qualitative evaluation of a novel technology-based intervention to support physical activity among cancer survivors

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Purpose: Physical activity minimizes the side effects of cancer, yet, participation rates by cancer survivors are significantly lower than the general population. Innovative strategies are needed to support cancer survivors' physical activity intentions. The purpose of this study was to examine cancer survivor perspectives on technology to support physical activity maintenance outside of a structured program.

Methods: Structured phone interviews were conducted with 23 cancer survivors (mean age 57.9 (range 31-78) following a 4-week pilot of a tailored text message, FitBit, and health coach intervention. All interviews were audio-recorded and transcribed. A team iteratively coded transcripts from the interviews using thematic analysis.

Results: Five themes emerged relating the intervention components to facilitating physical activity maintenance: 1) accountability to a remote partner; 2) value in planning for barriers; 3) influence on maintaining habits; 4) convenience of technology; and 5) reclaiming ownership of health following a cancer diagnosis. Overall, participants perceived that the text messages, FitBit, and health coach supported maintenance of exercise plans in the absence of a facility-based program.

Conclusions: Participants attributed physical activity maintenance to accountability enabled by technology. Participants expressed appreciation for having someone monitoring their physical activity levels and encouraging them, rather than negative feelings of being watched. Participants also acknowledged value of continued support despite being independent with a home exercise program. This study highlights the importance of accountability, support, and planning in physical activity adherence, and the positive role that technology can provide to support cancer survivors to regain control of health management.

35.

Examining discrepancies between self-reported and objective measures of adherence in teens with type 1 diabetes

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Discrepancies between self-reported and objective measures of adherence have been associated with impairments in physical and psychosocial health. This study examined if discrepancies between objective and self/parent-reported adherence were associated with impaired family functioning and HbA1c in teens with poorly controlled type 1 diabetes (T1D). Teens with T1D (n=61, HbA1c>8%) and their parents completed an assessment including: teen and parent-reported adherence and parent-reported family conflict related to T1D management and parental monitoring of T1D care. Objective adherence was measured through glucometer downloads of self-monitoring of blood glucose (SMBG) and HbA1c through blood test. Discrepancy scores were calculated by translating adherence measures into z-scores and then subtracting: (a) parent-reported adherence from SMBG and (b) teen-reported adherence from SMBG. Correlation analyses showed that above average SMBG but lower parent-reported adherence was associated with greater family conflict, less teen disclosure, and more parent solicitation (e.g. How often did you ask your child what his/her blood glucose readings were?) (p's<.05). Above average SMBG, but lower teen-reported adherence was associated with more parent solicitation (p<.05). HbA1c was not associated with either discrepancy. When teens were engaging in a greater than average frequency of SMBG, but either parent or teen perceived adherence as poorer than average, there were greater impairments in family functioning. These discrepancies may be important indictors of impaired family functioning, which is known to predict worsening metabolic control across adolescence (King et al., 2012). Future research should examine if these discrepancies predict trajectories of metabolic control or response to behavioral interventions.

36.

A nationally-scalable contingency management implementation for routine behavioral health care

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Effective behavioral management is often essential for successful outcomes in chronic illnesses ranging from addiction to HIV to cardiac disease. Contingency Management (CM) is a highly effective, evidence-based methodology based on tangible incentives for achieving objective goals, which has been shown to improve outcomes in addiction treatment across all substances. CM may be similarly promising for improving behavioral management in cardiac rehabilitation or other diseases.

DynamiCare Health™ is a fully-automated, scalable, patent-pending technology for (1) managing CM incentives, (2) tracking and reporting data, and (3) using machine learning to provide impending relapse/dropout risk alerts to providers and support resources for timely intervention.

Patients enroll with the DynamiCare platform early in inpatient or outpatient treatment. The app provides an easy-to-use escrow financial management account into which the patient deposits funds for CM reward incentives from multiple sources: direct deposit wages, welfare payments, family allowances or crowdfunding donations. The patient receives the DynamiCare app which includes appointment tracking (via GPS). Depending on the condition, the patient receives companion hardware such as a drug testing device (breathalyzer, CO detector, or saliva drug test cups) for addiction, or an activity tracker for cardiac disease. Abstinence, medication adherence, exercise, or treatment attendance earns progressive financial rewards from the escrow account onto a debit card. Attendance and spending pattern data predict impending risk of relapse in real time, enabling early intervention. Initial back-testing on spending data with machine learning has generated new, previously un-hypothesized independent variables in drug addiction, correctly predicting 70% of acute drop-outs.

37.

Demographic and substance use profiles of alcohol-using pregnant women entering treatment

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OBJECTIVE: Both alcohol and use of other substances during pregnancy are common. This descriptive study examines the prevalence of polysubstance use and the demographic, socio-economic, treatment related factors associated with alcohol use during pregnancy among pregnant women entering substance use treatment in the United States.
METHODS: Using the Treatment Episode Data Set, the study population included pregnant women reporting alcohol use upon entry into substance use treatment in the United States for the first time between 1992 and 2012.
RESULTS: From 1992 to 2012, 166,863 pregnant women were admitted to treatment for the first time, and 71,960 (43%) reported alcohol use. Among alcohol users, close to 50% were in 20's, over 50% were White, and most were non-Hispanic. The majority were not married. Most reported 12 years or less of education and were either Medicaid-eligible or had no health insurance. Over 60% entered into non-intensive outpatient substance use treatment. Approximately 75% of these alcohol users reported polysubstance use, with marijuana being the most prevalent (46%) followed by cocaine (29%), methamphetamine (15%), and opioids (7%). The reported primary drugs of choice as the reason for treatment admission were alcohol (50%), marijuana (18%), cocaine (17%), methamphetamine (10%), and opioids (4%).
CONCLUSION: Alcohol using women commonly use other substances, including both stimulants and non-stimulants. Many of these women also are socio-economically disadvantaged. The potential clinical and public health impacts of prenatal alcohol use during pregnancy and beyond are significant. Targeted substance use interventions for women should focus on polysubstance use as well as giving special attention to certain high risk groups.

38.

Increasing physical activity in college students with Autism Spectrum Disorder

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The consequences of sufficient physical activity have long been reported to have a variety of benefits such as decreased risks of developing cardiovascular diseases, diabetes, osteoporosis, and some cancers (Centers for Disease Control and Prevention [CDC], 2015; Sandhu, Shafiq, & Singh, 2013; Srinivasan et al., 2014; World Health Organization [WHO], 2016), while having a positive impact on mental health (CDC, 2015; Sandhu, Shafiq, & Singh, 2013). An overwhelming number of adults in the United States have failed to meet the prescribed recommendations, with approximately 20% meeting the recommendations (CDC, 2013). Unsurprisingly, the lack of physical activity is also prevalent among college students. According to the American College Health Association-National College Health Assessment (ACHA-NCHA), only 45.4% of the sampled students engaged in the prescribed

recommendations for aerobic activity (ACHA-NCHA II, 2016). In an attempt to increase aerobic physical activity among college students with autism spectrum disorder (ASD), a goal-setting and peer-pairing treatment package was implemented and evaluated with a multiple-baseline-across-participants design. The participants' goals were individualized and systematically increased throughout the course of the study. The paired-peers provided daily goal reminders and met with their assigned participant on a weekly basis. The data suggest that goal-setting and peer-pairing were effective in increasing levels of physical activity for two out of three participants.

39.

Increasing physical activity in adults with intellectual disabilities: A preliminary evaluation

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People with intellectual disabilities have been reported to have high rates of physical inactivity, overweight, and obesity (Melville, Hamilton, Hankey, Miller, & Boyle, 2007). This study evaluated a goal-setting and interdependent group contingency strategy on physical activity with four young adults with intellectual disabilities. Aerobic physical activity was measured as accumulated number of steps per school day. Each participant pair accessed preferred items or activities contingent on meeting or exceeding their individual goals. Prior to intervention, the participants' average number of steps were 2,693, 3,519, 4,006, and 5,701. During the final week of the intervention, the participants' average number of steps were 4,521, 6,016, 5,064, and 7,563, respectively. The data suggest that physical activity levels were higher during the intervention weeks for all four participants. The results provide initial support for the efficacy of goal-setting and group contingency strategies among young adults with intellectual disabilities in a school setting.

40.

Game-based incentives to improve use of an automated, self-management system for methadone patients

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Automated, self-management systems (ASMS) can increase use of coping skills in high risk situations and improve treatment outcome. However, ASMS's for substance use disorder have found limited patient engagement and generally not shown efficacy. Thus, methods to engage and retain patient interest and increase use are needed. Game-based (GB) interventions, or "health games," have shown promise for a range of health behaviors. We are currently conducting iterative, 2-week development cycles of a GB-ASMS focused on behavioral reinforcement for opioid dependent individuals with continued drug use in methadone maintenance treatment. We have completed an initial cycle (n=7) and are conducting a second. Patients earn points for minutes of system calls, number of modules, use of new modules, and consecutive days of calls. Patients "level-up" at different point totals to gain access to more sections. Compared to use of the system without the GB components,

the proportion of patients engaged with the ASMS was similar, but engaged patients (>2 calls) had almost twice as much call time (96 vs. 51 min.). In follow-up interviews, participants reported liking "unlocking" levels and that points made the content more interesting and attractive. Although preliminary, the findings are encouraging and indicate that even simple game components may increase patient engagement and use of an ASMS

41.
A review of behavior analytic interventions targeting healthy eating and exercise

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Introduction. According to the Center for Disease Control, 34.7% of adults in the U.S. were obese in 2015. Behavior Analysts have demonstrated effective interventions in a variety of areas including healthy eating and exercise increases. The purpose of this study is (1) to review behavior analytic literature concerning food choice interventions and exercise and (2) encourage more research from behavior analysts in these areas.
Method. An online database (PubMed) was utilized to identify interventions within *The Journal of Applied Behavior Analysis* (1968-2016) using the search terms: weight, obesity, food, exercise, physical activity, physical education, body mass index, health education, or mealtime. Articles were selected for inclusion if they evaluated an intervention that targeted weight loss, increase in exercise, or increase in healthy eating choices with humans.
Results. Initial results yielded 189 articles, 21 met selection criteria for the review. All 21 articles demonstrated success of varying degrees. Of the 21 articles included in the review, 11 articles targeted increase in physical activity; seven, increase in healthy eating; three, weight loss. Paradoxically, only 10 of the 21 articles were published within the last 10 years.
Conclusion. Interventions demonstrated success for a range of target behaviors. Unfortunately, less than half of the articles meeting inclusion criteria were published in the last ten years. This calls for more behavior analytic research concerning eating and exercise behaviors.

42.
Predicting adolescent cannabis use in males and females from multimodal data

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Cross-validated logistic-regression with elastic-net regularization was used to generate sex-specific predictive models of age-16 cannabis use from age-14 data (N=1389). The male-only analysis (N=648; age-16 users n=110) yielded a ROC AUC=0.71 (p < 1.92 x 10^{-12}), while the female-only analysis (N=741, age-16 users n=63) yielded a ROC AUC=0.81 (p < 1.99 x 10^{-15}) indicating a high degree of predictive performance. To assess sex-specificity, predictors identified from the male-only analysis were tested on the female sample using multiple regression, and vice versa. Likewise, to assess drug-specificity, predictors identified from the cannabis analyses were tested on a related but independent sample of age-16 binge drinking individuals using multiple regression. Results indicate age-16 cannabis use is reliably predicted for both sexes using seven shared psychometric predictors (age-14 alcohol and cigarette use, parental cannabis use, and various personality and life event measures), whereas neuroimaging data shows sex specificity. While the psychometric predictors also modeled age-16 binge drinking, the brain predictors showed sex- and drug-specificity for cannabis use, suggesting cannabis use in males is best predicted via response inhibition fMRI differences, and cannabis use in females is best predicted via social processing (faces) fMRI differences. Thus, this study highlights the importance of sex-specific predictive models of substance abuse. The identification of sex- and drug-specific predictive profiles may inform etiological mechanisms and targets for proactive intervention.

43.
Undetected fentanyl use among patients receiving methadone or buprenorphine treatment

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Background: Illicit use of the potent opioid agonist fentanyl has increased dramatically in recent years and fueled a surge in fatal and non-fatal overdoses. Despite these serious public health consequences, the laboratory methods currently used in clinical settings do not readily detect recent fentanyl use, resulting in the high probability of false-negative results among patients receiving treatment for opioid dependence.
Aim: To examine the extent of fentanyl use among two clinical samples of opioid-dependent adults: 1) Patients enrolled in an outpatient opioid treatment program (OTP) in Burlington, VT and 2) Participants in a NIH-funded clinical trial evaluating interim buprenorphine dosing for reducing illicit drug use during waitlist delays.
Methods: 350 urine specimens will be collected under same-sex staff observation and tested on-site using three methods: (1) enzyme multiplied immunoassay (Microgenics, Fremont, CA) assays for opioid other than fentanyl (e.g., methadone, buprenorphine, oxycodone, hydrocodone, hydromorphone, heroin), (2) an All Tests dipstick with a 100 ng/ml fentanyl cutpoint (All Tests, Gilbert, AZ), and (3) a DRI enzyme immunoassay test assay with a 2 ng/ml fentanyl cutpoint (Microgenics, Fremont, CA).
Results: We will report on the percent of urine specimens positive for fentanyl and other opioids among opioid-dependent adults seeking or enrolled in opioid agonist treatment. This information will permit us to better understand the extent of illicit fentanyl use that is currently going undetected under standard testing methods. This project stands to inform clinical and programmatic decisions by other opioid and nonopioid treatment programs in Vermont and elsewhere. Results from the complete project will be available for presentation at the October 2016 VCBH conference.

44.

Cocaine administration dose-dependently increases sexual desire and decreases condom use likelihood via delay and probability discounting

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Although cocaine use has been linked to sexual HIV risk for decades, the direct effects of cocaine on sexual desire and decision-making are unexamined. Previous research suggests delay discounting (devaluation of future outcomes) and probability discounting (devaluation of uncertain outcomes) play roles in condom use decisions. This study examined the effect of cocaine administration on sexual desire, hypothetical condom use, and discounting tasks. This double-blind, within-subjects study compared the effects of 0, 125 and 250 mg/70 kg oral cocaine HCl in 12 cocaine users. Measures included sexual desire and other subjective ratings, the Sexual Delay Discounting Task, the Sexual Probability Discounting Task, and monetary delay and probability discounting tasks. Cocaine caused dose-related increases in sexual desire and prototypical stimulant abuse-liability ratings. Relative to placebo, cocaine did not significantly alter condom use likelihood when a condom was immediately available and when sex was associated with certain STI acquisition. In contrast, cocaine dose-dependently increased the ability of delay (sexual delay discounting) and STI uncertainty (sexual probability discounting) to decrease condom use likelihood. Cocaine caused no significant change in monetary delay and probability discounting. This is the first research study showing cocaine administration increases sexual desire. Detrimental effects of cocaine on HIV risk were only observed under conditions where safer sex required delay or STI risk was uncertain (representative of many real-world scenarios), suggesting a critical role of discounting processes. Lack of effects on monetary outcomes highlight the importance of studying clinically relevant outcomes when examining the effects of drugs on behavioral processes.

45.

Reducing the negative impact of context change on an operant response

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A context switch following training weakens an operant response. One way to reduce this decrement is to train the response in multiple contexts. On one view, this causes conditioning of more stimulus elements that are common across contexts, increasing generalization. On another view, training procedures that make memory retrieval difficult (like inserting context changes) increase memory strength (Bjork & Bjork, 1992). Two experiments separated these hypotheses. In Experiment 1, rats learned to nosepoke for a food reinforcer. For one group, all six acquisition sessions occurred in Context A. For a second group, two sessions occurred in Context A, two in Context B, and two in Context C. Rats were then tested in the most recent context and in a novel context. Both groups showed a response decrement in the novel context, but it was less pronounced in the variably-trained group. Experiment 2 asked whether long retention intervals, which also make retrieval difficult, likewise reduce the context change effect. All acquisition sessions occurred in the same context. For

one group, every two sessions were separated by a 14-day retention interval. For another, all sessions were separated by the usual 24 hrs. Responding was then tested in the acquisition context and a novel context. Despite the retention interval disrupting acquisition performance like context change did in Experiment 1, the final context switch affected performance similarly in the two groups. The results suggest that conditioning of common elements, rather than difficult retrieval practice, creates a behavior that is more resistant to decrement caused by context change.

46.

Preventing relapse after incentivized choice treatment: A laboratory analysis

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Contingency Management (CM) interventions provide incentives for new behaviors (R2) that decrease the strength of unwanted behavior (R1). Unfortunately, when the incentives are discontinued after treatment, relapse of R1 often occurs. Laboratory studies can inform CM by discovering the elements of CM interventions that might reduce, or prevent, relapse. These parameters most often increase generalization from treatment (R2 is reinforced) to post-treatment conditions (R2 is no longer reinforced). Here we report two experiments with rats that examined relapse to R1 that occurred when an "incentivized choice" of R2 ("CM") was discontinued. In each experiment, R1 was first reinforced with one outcome (O1). After R1 was acquired, R2 was introduced and reinforced with a larger magnitude O2. Although R1 could still earn O1, as in CM, the treatment effectively reduced R1 to a low level. We then studied the rate of relapse that occurred when reinforcement for R2 was discontinued. In Experiment 1, experimental groups received O2 or O1 delivered noncontingently during relapse testing. In Experiment 2, groups received similar tests with a smaller (medium-sized) noncontingent O1 or O2. In each experiment, a third group was tested without noncontingent reinforcers. Overall, delivering noncontingent reinforcers decreased the rate at which rats relapsed to R1, though there was no difference in the effectiveness of O1 and O2. The results are consistent with principles of behavioral economics (i.e., the quantitative law of effect): Presenting alternative reinforcers reduces target (unwanted) behavior during both treatment and relapse testing.

47.

How to break a habit

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Habits are behaviors that are insensitive to the value of their consequences. Recent computational theories suggest that habits are composed of several actions executed rapidly as a single unit. On this view, the organism selects a habit instead of a deliberate action when the reward rate for rapid performance is high. This suggests that habits will become actions (i.e., deliberative) when the reward rate is decreased or discontinued. In the present study, rats pressed a lever for a reinforcer (R-O1) over an extended period of training that created a habit. For half the rats, the reinforcer was then devalued by pairing it with illness. The remaining rats received the reinforcer and illness unpaired. Half the rats from each group then received an extended session in which lever pressing was extinguished. Responding decreased and reached essentially zero during the test; however, responding did not become sensitive to devaluation,

suggesting it remained a habit throughout the test. The remaining rats were tested with lever pressing for a different reinforcer (O2). Here, O2 caused responding in the paired group to decrease robustly (compared to the unpaired group); O2 thus caused the behavior to convert to an action. Responding decreased even though the rats consumed every O2 pellet, and showed no generalization of the taste aversion from O1 to O2. Therefore, changing the outcome converted a habit back into an action, but extinction training did not. The results suggest a method for breaking a habit, but do not support the computational account of habits.

48.
Renewal in the context of stress:
A potential mechanism for stress-induced reinstatement.

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Exposure to a stressor can cause the relapse of extinguished drug taking ("stress-induced reinstatement"). Interestingly, behaviors reinforced with food are not normally susceptible to such relapse after stress. One explanation is that drug use may uniquely activate the stress system. Drug seeking is therefore acquired in the context of stress and becomes susceptible to ABA renewal when stress occurs after extinction. A series of experiments tested this hypothesis. In the first, rats received 10 daily sessions in which lever pressing was reinforced with sucrose pellets. Group Acquisition Stress received daily exposure to a stressor from a multivariate stress protocol immediately prior to Sessions 4-10; a control group received no stress. Over the next 5 days, all rats then received daily extinction sessions (lever responses no longer produced sucrose pellets) without prior stress. Over the final two days, lever pressing was tested in a session preceded by a stressor and another session without stress (order counterbalanced). Rats in Group Acquisition Stress responded at a much greater rate in the post-stressor test. There was no such effect in the controls. The results support the notion that stress may function as a context in which behavior is initially learned: Stress exposure after extinction may cause relapse because it returns the organism to the original learning context (ABA renewal). Additional experiments examined a related "incentive learning" explanation which holds that consuming sucrose following stress allows the animal to learn that sucrose "makes it feel good" in the context of stress.

49.
Psychometric assessment of the marijuana adolescent problem inventory

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Abstract: Cannabis is the most commonly used illicit substance among adolescents in the United States. Adolescent cannabis use is associated with many negative outcomes, such as problems with friends, family, and school. These data underscore the importance of a psychometrically valid measure assessing the common problems associated with adolescent cannabis use. The present study was designed to evaluate the psychometric properties of the Marijuana Adolescent Problem Index (MAPI) across a combined sample of five clinical trials. Cannabis-using adolescents (n = 729), aged 12-18 years, completed assessments at intake prior to randomization, 3-month follow-up, and 6-month follow-up. Several sets of analyses were performed to evaluate the internal and external validity of the MAPI. The sample was randomly split in half to first conduct a principal component analysis (PCA) and then a confirmatory factor analysis (CFA). Reliability analyses were also performed to test internal validity of the MAPI. The measures of reliability, PCA, and CFA all suggest that the MAPI demonstrates internal validity. Associations of the MAPI with cannabis-relevant outcome variables were also tested. When controlling for demographic and study-specific covariates, the MAPI at intake significantly predicted diagnosis of marijuana dependence ($p < .05$) as well as frequency of marijuana use at the 3-month ($p < .05$) and 6-month follow-ups ($p < .05$). Additional indices of cannabis use will be tested to further examine the MAPI's external validity. Findings will be discussed in terms of the multiple research and clinical implications of the psychometrically sound MAPI.

50.
Cannabis legalization: potential impact on vaping and use of edible products among youth

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Background: Specific provisions of cannabis laws (CLs) may have unique effects on the likelihood that youth will use alternative methods of cannabis administration (e.g. vaping and edibles) and the age of method onset - potentially altering the developmental harms of cannabis use. The purpose of this study was to examine how CL features (e.g. stipulations related to dispensaries, home cultivation, etc.) differentially impact how youth consume cannabis.
Methods: Using Facebook, we distributed an online survey targeting cannabis-using youth (n=2630). We coded CL features for each U.S. state. Logistic and linear regressions tested associations among lifetime use and age of onset of vaping and edible use and CL features.
Results: Higher dispensary densities and longer CL duration were related to higher likelihoods of trying vaping and edibles. Respondents from CL states that permit home cultivation were more likely to have tried edibles (OR: 1.92, 95% CI: 1.49, 2.47) but not vaping. Adjusting for home cultivation noticeably affected the predictive power of other CL features in edible but not vaping models. Similar patterns emerged in the age of onset models.
Conclusion: Multiple CL features are related to increased likelihood of vaping and edible use among youth. Dispensaries may contribute to increased product diversity and access to attractive vaping and edible products. The desire to economize left-over plant material from home cultivated plants may uniquely influence the likelihood of homemade edible use. Continued epidemiological investigations of the relationship between methods of administration and CL features can inform effective cannabis regulation strategies.