been studied across imagined drinking situations, but researchers have not systematically investigated this process in in vivo situations. In this study, the Expectancy/Context Questionnaire (ECQ) was utilized in three imagined and two in vivo situations. Expectancies as measured by the ECQ were found to be sensitive to contextual variation as well as drinking behavior.

ETHANOL AS A FORAGEABLE COMMODITY: EFFECTS OF SEARCH COST. Anthony Liguori. Boston University.

Four rats searched on an FR schedule for any of six available commodity opportunities (low- or high-procurement-cost food, water, or ethanol), each of which could be subsequently obtained by responding 5 times (low-cost) or 50 times (high-cost) on the commodity's associated lever. As search cost rose from 5 to 400, high-cost acceptance rates rose for all three commodities; low-cost acceptance rates rose slightly from their previous high levels. Ethanol consumption inceased slightly while food and water consumption decreased. Results show that rats behave toward ethanol, water, and food as they do toward food alone when search costs increase.

RELATIONSHIP OF ANXIETY, DEPRESSION, AND DRUG USE TO HIV RISK BEHAVIOR. Robert M. Malow,*† Tanya M. Bannister,* Sheila A. Corrigan,*† A. Mark Calkins* and Jose M. Pena.*† *Veterans Affairs Medical Center, †Department of Psychiatry and Neurology, Tulane University of Medicine, New Orleans, LA.

This study extends prior investigations of risk behaviors for acquiring and transmitting HIV among treatment-seeking drug abusers by analyzing the relationship of HIV risk behavior to drug use and psychopathology variables. The Beck Depression Inventory, State-Trait Anxiety Inventory and measures of AIDS-related knowledge were administered to 112 inpatient admissions to a VA Drug Dependence Treatment Unit. Subjects with high anxiety and depression scores reported engaging in significantly more HIV drug risk behaviors than other subjects. Polydrug users also reported being at greater risk than subjects solely abusing cocaine. However, groups did not differ in HIV sexual risk behavior. The clinical implications of these findings are discussed.

PSYCHOPATHOLOGY DIFFERENCES BETWEEN COCAINE AND SPEEDBALL USERS. Robert M. Malow, Jeffrey A. West, Sheila A. Corrigan, Jose M. Pena and W. Criss Lott. VA Medical Center, New Orleans; Department of Psychiatry and Neurology, Tulane University Medical Center.

Affective distress and related psychopathology symptoms associated with coinjected cocaine and opioid ("speedball") use are incompletely explored, and the extent to which they diverge from problems shown by cocaine abusers who do not prefer opioids is unknown. This investigation compared groups of speedball and nonspeedball cocaine users on global measures of depression and anxiety and modal groupings of personality characteristics measured by the MMPI. Compared to men who use cocaine without opioids, compulsive speedball users evidenced significantly greater problems with depression, trait anxiety, and related symptomatology, and were more uniformly characterized by modal profiles reflecting severe psychopathology and maladjustment. These results agree with descriptions of severe pathology associated with speedball use.

CAFFEINE AND TIME OF DAY EFFECTS ON HUMAN PHYSIOLOGICAL TREMOR. L. Stephen Miller, Charles P. Stroble, James D. Griffin, Elizabeth A. Jenkins, Suzanne Hasseltine, Thomas W. Lombardo and Stephen C. Fowler. University of Mississippi, University, MS.

We tested the effects of consumptive levels of caffeine and time of day on physiological tremor of male university students. We found that caffeine significantly affected physiological tremor at moderate doses (3 mg caffeine/kg body wt.) but not at low doses (1 mg caffeine/kg body wt.). Physiological tremor was not affected by time of day or the interaction of caffeine and time of day. Our findings suggest that the ingestion of moderate levels of caffeine results in measurable changes in physiological functioning, and that physiological tremor may be a sensitive measure of physiological change due to drug effects. However, our results suggest that it may not reliably detect time of day changes in functioning.

FAMILY HISTORY AND ALCOHOL PROBLEMS IN IMPULSIVE AND NONIMPULSIVE INDIVIDUALS. Carolyn L. Morse and Vincent J. Adesso. The University of Wisconsin-Milwaukee, Milwaukee, WI.

Impulsive and nonimpulsive young, male, heavy drinkers were compared in their report of problems resulting from their drinking, their family history of alcohol problems, and personality variables. Impulsives had a higher score on the alcohol symptom checklist and a marginally higher global score reflecting family history of alcohol problems. The family history and symptom checklist scores were highly correlated. Of the personality variables, a measure of adult conduct problems was found to be the best predictor of both family history and alcohol symptoms. Individual symptoms and symptom categories as they relate to impulsivity and family history were also studied.

SCRATCHING INDUCED BY DOPAMINE D-2 AGONISTS IN SQUIRREL MONKEYS. Richardo Pellon and Jonathan L. Katz. NIDA Addiction Research Center, Baltimore, MD.

Four squirrel monkeys were tested under a cumulative dosing procedure to evaluate the ability of dopamine D-2 receptor agonists to produce scratching. Quinpirole and propylnorapomorphine produced dose-related increases in scratching; sensitivity to these drugs increased after initial observations. Propylnorapomorphine was always more potent than quinpirole in producing scratching. Dopamine D-1 receptor agonists, SKF 38393 and SKF 75760, as well as morphine, cocaine and *d*-amphetamine failed to produce dose-dependent increases in persistent and excessive scratching behavior. Scratching in squirrel monkeys appears to differentiate the behavioral effects produced by dopamine D-1 and D-2 receptor agonists, and may result in an important behavioral tool to investigate further compounds with different affinities for dopamine D-1 and D-2 receptors.

CAFFEINE EFFECTS ON ALERTNESS AND PERFORMANCE FOLLOWING SLEEP DEPRIVATION. D. M. Penetar, D. R. Thorne, U. D. McCann, J. B. Fertig, A. S. Schelling, M. L. Thomas, H. C. Sing and G. L. Belenky. Walter Reed Army Institute of Research, Washington, DC.

Caffeine (150, 300 or 600 mg/70 kg) or placebo was administered orally to 50 male volunteers following 49 hours of sleep

deprivation. Effects on alertness and cognitive performance were assessed for 12 hours following drug administration. Results from the Multiple Sleep Latency tests show that caffeine reversed sleep deprivation-induced decreases in alertness for 6 hours. Caffeine did not increase sleep latencies to presleep deprivation levels, however. Cognitive performance degraded by sleep deprivation was improved following drug. The highest dose tested improved accuracy on a sustained attention task and on a logical reasoning task, and speed on a choice reaction time task to presleep deprivation levels for 12 hours.

EFFECTS OF TRIAZOLAM AND LORAZEPAM ON HUMAN LEARNING AND PERFORMANCE. Craig R. Rush, Stephen T. Higgins, Warren K. Bickel and John R. Hughes. University of Vermont, Burlington, VT.

The present experiment assessed whether triazolam (0–0.75 mg) and lorazepam (0–6 mg) differentially affect human discriminated-operant behavior. Eight healthy male volunteers were tested during an 8-hour session using a counterbalanced, crossover design. Experimental tasks included the repeated acquisition and performance of behavioral sequences, Digit-Symbol-Substitution Test (DSST), Visual-Analog Rating Scales (VAS), and Addiction Research Center Inventory (ARCI). Both drugs disrupted responding under the repeated acquisition and DSST procedures in a dose- and time-dependent fashion. Similar dose- and time-dependent effects were evident with subject ratings of drug effects. The two compounds differed in terms of onset, duration of effect, and potency (7:1; TZ > LZ), but did not differ in magnitude of effect. These results suggest that the liability associated with the use and abuse of triazolam and lorazepam are comparable, as measured via discriminated-operant procedures and subject ratings of drug effects.

CONTINGENT TOLERANCE TO CHLORDIAZEPOXIDE (CDP) IN RATS: DIFFERENTIAL EFFECTS OF BENZODIAZEPINE (BZ) AND NON-BZ DRUGS. C. A. Sannerud, A. J. G. Alastra and P. L. Harger. The Johns Hopkins University Medical School, Baltimore, MD.

Environmental variables can influence the development of tolerance to the effects of BZ. The interaction between drug administration and the ability to perform the task can result in differential tolerance that is a function of chronic daily dose and duration of treatment. The present study evaluated the role of environmental variables in the development of tolerance to the sedative effects of CDP and the effect of chronic CDP on the sensitivity to acute administration of other BZ and non-BZ drugs. Sprague-Dawley rats were trained to respond under a multiple time-out 10 min, fixed ratio 30 schedule of food pellet delivery. Cumulative dose response curves for CDP, midazolam (MDZ), flumazenil (RO), pentobarbital (PB), caffeine, and *d*-amphetamine were determined prior to and during chronic CDP. Rats received 18 mg/kg CDP either before (PRE, n = 4) or after (POST, n = 5) exposure to the daily experimental session for 7 weeks. Tolerance testing was accomplished by generating dose-response curves for CDP at weekly intervals. Large group differences were seen in the rate and degree of tolerance development to CDP. Group PRE showed 2- to 5-fold shifts to the right in the weekly CDP dose-response curves, 3- to 10-fold tolerance to MDZ and increased sensitivity to RO. Group POST showed no tolerance to CDP or MDZ, and only a slight change in sensitivity to RO. Only Group PRE showed cross-tolerance to PB. Neither group showed a change in sensitivity to caffeine or *d*-amphetamine. (Supported by NIDA grant DA 01147.)

CONTEXTUAL MODULATION OF HUMAN STIMULANT SELF-ADMINISTRATION. Kenneth Silverman, Kimberly C. Kirby and Roland R. Griffiths. The Johns Hopkins University School of Medicine, Baltimore, MD.

This study assessed the influence of environmental context on *d*-amphetamine self-administration in seven recreational stimulant users. Initially, subjects were given color-coded capsules containing either placebo or *d*-amphetamine in random order across days. Environmental contexts were manipulated by scheduling one of two activities each day immediately following drug ingestion: A relaxation activity or a computer vigilance activity. In a subsequent choice phase, six of seven subjects reliably chose ($\geq$9 of 10 choices per subject) to take *d*-amphetamine when the vigilance task was scheduled and placebo when the relaxation task was scheduled. The study provides evidence for the contextual modulation of drug self-administration.

COGNITIVE MOTIVATIONS, SENSATION SEEKING, AND DRINKING PROBLEMS: A LONGITUDINAL STUDY. Alan W. Stacy, M. D. Newcomb and P. M. Bentler. University of California, Los Angeles, CA.

We evaluated the longitudinal effects of adolescent cognitive motivation for alcohol use and sensation seeking on adult drinking problems and driving while intoxicated (DWI). Results indicated that the cognitive motivation factor was a significant, independent, nine-year predictor of a factor of drinking problems. Over this same period, certain cognitive motivation and sensation seeking indicators independently predicted DWI, and the sensation seeking factor independently predicted cognitive motivation and alcohol use factors. The independent effects on problem drinking demonstrated that psychosocial vulnerability appeared across a range of consumption levels, consistent with previous notions that drinking problems are not fully mediated by consumption patterns alone.

PERSONALITY CHARACTERISTICS IN SUBSTANCE ABUSE AND RELATIONSHIP TO PHYSIOLOGICAL PARAMETERS IN HUMANS. J. M. Stapleton, B. C. K. Yung, M. L. Spurgeon, M. J. Morgan, R. L. Phillips, N. G. Cascella, J. H. Jaffe, D. F. Wong and E. D. London. NIDA Addiction Research Center, Johns Hopkins Medical Institution, Baltimore, MD.

Personality characteristics were measured and related to physiological parameters, including regional cerebral glucose metabolic rate (rCMRglc), derived from placebo sessions of ongoing positron emission tomography (PET) studies. Details of methods may be found in London et al. (Arch. Gen. Psychiatry 47:73–81; 47:567–574; 1990). Substance-abusing subjects scored higher than published norms on several personality measures, including the Assault Subscale of the Buss-Durkee Hostility Inventory (AS-BD), the Psychoticism scale of the Eysenck Personality Questionnaire, and the Novelty Seeking scale of the Tridimensional Personality Questionnaire. The AS-BD score was positively correlated with mean rCMRglc across all frontal regions of the brain [$r(20) = +.613$, $p<0.01$]. Scores on the Reward Dependence subscale of the Tridimensional Personality questionnaire were negatively correlated with rCMRglc in superior temporal gyrus [left: $r(12) = -.631$, $p<0.02$; right: $r(12) = -.701$,