

scans. However, it is not clear whether or how this task affects the subjects' metabolic or mood responses to the drug. Finally, both the mood-altering and the metabolic effects may depend critically on the dose of drug tested and on the characteristics of the subjects. It is important that a wide range of doses be tested, and that subject characteristics be examined carefully. These issues will be discussed with respect to selected data from our laboratory.

**RECEPTOR LIGAND STUDIES USING PET.** Nora Volkow, David Schlyer, Joanna Fowler, Gene Wong, Robert MacGregor and Alfred Wolf. Brookhaven National Laboratory, Upton, NY.

One of the unique advantages which PET has over other types of imaging modalities is the ability to assess receptor dynamics *in vivo*. By using specific radiolabelled compounds, it is possible to quantitate the availability of particular receptor systems and to define the interactions with other receptor systems. This ability makes PET extremely valuable in studying the mode of action in drugs of abuse. The effect on the receptor systems after chronic use of cocaine and other drugs of abuse can be evaluated and the effects of detoxification on the receptor systems over a period of time can also be determined. In the current studies, the effect of cocaine abuse and detoxification on the dopamine receptor system in terms of the presynaptic dopamine transporter, the postsynaptic dopamine D-2 receptor and the glucose metabolism of the regions involved with the dopamine receptors has been assessed. The studies were carried out in patients soon after detoxification and again after several months to determine the changes in the receptor systems over the period of detoxification. It has been found that the receptor systems and the associated glucose metabolism undergo variations which may be linked to the psychiatric symptoms. These observations may lead to a better understanding of the processes involved at the receptor level in detoxification. An understanding of the mechanism of detoxification could provide insights into more effective therapies.

**TOPOGRAPHIC MAPPING AND SOURCE LOCALIZATION OF EEG AND ERP DIPOLES.** Scott E. Lukas, Elena Kouri, Michelle Fortin and Leslie Amass. McLean Hospital/Harvard Medical School, Belmont, MA.

Drug-induced intoxication and changes in mood states are associated with episodic alterations in neurophysiological activity that are most easily quantified using topographic mapping techniques. Such techniques permit the simultaneous viewing of electrical activity from all electrode sites on the scalp. Previous studies have shown that ethanol-, marijuana-, morphine-, amphetamine-, pentobarbital- and cocaine-induced states of euphoria are associated with increases in EEG alpha activity, predominantly over occipital and parietal areas. Auditory P300 evoked response potentials (ERPs) provide information about an individual's ability to selectively attend to novel stimuli. Source localization of alpha activity or ERPs can provide new and important information about the similarities and differences among the neurophysiological activities produced by these various drugs. Using mathematical algorithms, the origin of the P300 ERP was calculated to be in the hippocampal formation while the alpha rhythm appeared to originate in the thalamus. Drug-induced states of intoxication disrupt the apparent source of these waves and parallel subjects' inability to selectively attend to novel stimuli. When combined with magnetic resonance imaging techniques, dipole localization can help locate a specific neurophysi-

ological response with a time resolution of only a few milliseconds. (Supported by grants DA03994, DA04059 and DA00115 from the National Institute on Drug Abuse.)

**FUNCTIONAL MAGNETIC RESONANCE IMAGING OF COCAINE-TREATED RHESUS MONKEYS.** Thomas Aigner and Joseph Frank. NIMH, Bethesda, MD.

Rapid magnetic resonance imaging (MRI) using paramagnetic contrast agents has been shown to be a reliable method for detecting small changes in cerebral circulation. Chronic abuse of cocaine may lead to changes in blood flow as well as in other neuropathological abnormalities, such as subarachnoid hemorrhage and demyelination of white matter. To examine the feasibility of using MRI to document these changes in experimental animals, we compared two monkeys with an extensive history of cocaine self-administration with two normal controls. Scanning was performed in a GE Signa 1.5 T scanner with a 5" receive-only surface coil. In procedure I, we used a rapid (MR) scanning procedure in combination with dysprosium-DTPA-BMA to examine possible differences in cerebral perfusion in the two groups. This was done during two different scanning sessions, once before and once after a bolus injection of 0.3 mg/kg of cocaine. In procedure II, we used standard MRI techniques to examine grey-white matter differences using scanning parameters that provided a level of detail not previously possible with earlier techniques.

#### **PAPER SESSION**

*ADHD and Methylphenidate: Dosage Effects on Classroom Functioning and Internalizing Symptomatology*

Chair: *Mark D. Rapport*, University of Hawaii, Honolulu, HI.

**ATTENTION DEFICIT DISORDER: METHYLPHENIDATE DOSE-RESPONSE EFFECTS ON CLASSROOM BEHAVIOR.** Mark D. Rapport. University of Hawaii, Honolulu, HI.

This multi-year investigation was designed to examine the effects of methylphenidate (MPH) at four doses (5, 10, 15, 20 mg) on the attention, academic efficiency, and teacher-rated behavior of 75 children with Attention Deficit Disorder/Hyperactivity (using direct observations), and to compare these effects to functioning under baseline and placebo conditions. MPH significantly improved all areas of classroom functioning in a linear, dose-related fashion. Intermediate and individual level analyses, however, indicated a wide range of optimal response across subjects. Implications for the construction of individual dose-response potency profiles and the ability to predict behavioral response are discussed.

**PSYCHOSTIMULANT RESPONSE OF CHILDREN WITH ADHD: INTERACTION WITH INTERNALIZING SYMPTOMS.** Russell A. Barkley and George J. DuPaul. University of Massachusetts Medical Center, Worcester, MA.

This investigation was designed to assess whether methylphenidate (MPH) effects on ADHD symptoms differ between children who also display internalizing disturbance relative to those who do not. Significant interactions between MPH Dose and Internalizing Groups were found for only 5 of 28 assessment measures collected across home, school, and clinic settings. The three Internalizing groups evinced similar significant improvements in behavior associated with the two highest MPH

doses (10 and 15 mg). Comorbidity of internalizing symptoms (anxiety and/or depression) with ADHD is not necessarily associated with a lack of response to MPH as has been asserted in previous investigations.

**ATTENTION DEFICIT DISORDER: DOES METHYLPHENIDATE NORMALIZE CLASSROOM FUNCTIONING?** George J. DuPaul. University of Massachusetts Medical Center, Worcester, MA.

This study was designed to investigate whether methylphenidate (MPH) normalizes the classroom behavior and academic performance of children with Attention Deficit Disorder (ADD). MPH was found to significantly reduce the intrasubject variability in task-related attention of 30 children with ADD. Further, teacher ratings of ADD behavior and children's attention to academic tasks were improved to the extent that these measures were no different from those obtained by a 'normal' control group of 25 children. Alternatively, the academic performance of ADD children was improved, but not to the point of normalization, thus implicating the need for adjunctive interventions.

#### PAPER SESSION

*Drug Abuse Treatment: Pharmacological and Psychological Variables*

Chair: *Dace S. Svikis*, The Johns Hopkins University School of Medicine, Baltimore, MD.

**COUPONS BRING UNTREATED ADDICTS INTO DETOXIFICATION.** Maria F. Constantini, Tamara L. Wall, James L. Sorensen and David R. Gibson. University of California, San Francisco, CA.

This study examined the impact of a coupon distribution program designed to attract heroin abusers into treatment. Coupons, redeemable for a free 21-day detoxification, were distributed in the community by outreach workers. Demographic characteristics and length of time spent in treatment were examined for subjects who were recruited into treatment through coupon redemption ( $n=238$ ) and for subjects who entered via other referral sources ( $n=1129$ ). The coupon subjects were less likely to have been in treatment before, more were minorities, and more were practicing needle-sharing. Length of stay in treatment did not differ between the groups, showing their ability to respond to treatment when it is available.

**THE ANALYSIS OF COCAINE CHOICE IN HUMAN SUBJECTS.** Richard W. Foltin. The Johns Hopkins University School of Medicine, Baltimore, MD.

Healthy research volunteers, with histories of cocaine use, participated in laboratory sessions consisting of five to seven-choice trials with the first two or three trials being forced choices where the subject received each of two doses of cocaine (or a nondrug option), while there were no restrictions on choice for the remaining trials. 1) Subjects consistently chose larger doses of cocaine, 2) increasing the response cost for the large doses had no effect on choice behavior, 3) pairing money with small doses had no effect on choice behavior, 4) maintenance on the antidepressant desipramine had no effect on choice behavior, and 5) large smoked doses of cocaine were chosen over large IV doses of cocaine.

**MATCHING ALCOHOLICS TO COPING SKILLS OR INTERACTIONAL THERAPIES.** Mark D. Litt. University of Connecticut Health Center; Ronald M. Kadden. University of Connecticut School of Medicine; Ned L. Cooney. West Haven VA Medical Center; Herbert Getter. University of Connecticut.

This study tested the hypothesis that patients could be matched to effective alcoholism treatments on the basis of pretreatment characteristics. Specifically, it was hypothesized that those who showed greater sociopathy, psychopathology, or neuropsychological impairment would have better outcomes with coping skills training, and those with less impairment in these areas would have better outcomes with interactional treatment. Ninety-six male and female subjects were recruited from an inpatient alcoholism treatment program and randomly assigned to one of these two types of aftercare group treatment. The posttreatment data partially confirmed that coping skills training was more effective for subjects higher in sociopathy or psychopathology, and interactional therapy was more effective for those lower in sociopathy. Generally, both treatments appeared equally effective for subjects lower in psychopathology. Contrary to expectations, those more neuropsychologically impaired appeared to have better outcomes following interactional therapy. Survival analyses, using longitudinal data from a two-year outcome period, provided evidence for the durability of the matching interactions.

**COUNSELOR-TARGETED INTERVENTIONS: EFFECTS ON CLIENT PARTICIPATION IN DRUG TREATMENT.** Mary E. McCaul, Dace S. Svikis and Deborah L. Mangold. The Johns Hopkins University School of Medicine and The Francis Scott Key Medical Center, Baltimore, MD.

Treatment participation and associated outcome in drug-free treatment programs have traditionally been problematic, with most patients dropping out of treatment prematurely. Using behavioral strategies known to improve client treatment participation, we are examining the effectiveness of these interventions for increasing counselor behaviors that should positively impact on client outcome. In one study, each counselor was provided monthly written feedback on the participation of each client on his/her caseload relative to program standards. Counselor feedback significantly increased both clients' individual and group counseling attendance and the proportion of clients meeting minimum program standards. In a related study, counselor wages were changed from a fixed weekly salary to one contingent on the number of clients in attendance at weekly group sessions. Contingent counselor payment significantly increased the number of clients attending group counseling. These data suggest that counselor-targeted interventions offer effective and practical alternatives and/or adjuncts to more traditional client-targeted strategies.

**DETOXIFICATION FEAR: ITS PERSISTENCE AND ROLE IN METHADONE MAINTENANCE OUTCOME.** Jesse B. Milby. VA Medical Center, Birmingham, AL; Mary K. Sims and Mary Gentile. University of Alabama, Birmingham, AL; Ann Hohmann. NIMH, Rockville, MD; A. Thomas McLellan and George Woody. VAMC & University of Pennsylvania, Philadelphia, PA; Neil Haas. VAMC & University of California, Los Angeles, CA.

An original random sample of 271 opioid addicts in methadone maintenance treatment in Birmingham, Philadelphia and Sepulveda were assessed for presence of detoxification fear and