using the letter codes. If they were correct, they were so informed and also received bonus money. This phase consisted of 7 sessions with drug and placebo administered randomly approximately an equal number of times. If a subject correctly identified the capsules on 5 of these 7 occasions, they participated in a third phase consisting of 12 sessions. On 6 of these sessions, the procedure was identical to phase 2 with diazepam and placebo each administered on 3 occasions. Randomly intermixed with these training sessions were 6 test sessions. During these test sessions, subjects received 2 mg DZ, 5 mg DZ, 1 mg lorazepam, 2 mg lorazepam, 50 mg pentobarbital, or 10 mg *d*-amphetamine. Order of presentation was random across subjects. Subjects were not aware that a test session was scheduled until they telephoned the experimenter and they received bonus money regardless of their response (i.e., there was not a correct answer by definition). Sixteen of the 19 subjects learned the discrimination with overall accuracy of 90% during phase 2 which was maintained at a level of 85% during phase 3 training sessions. When 2 and 5 mg diazepam were administered drug-appropriate responding was 7% and 64%, respectively. Drug-appropriate responding increased from 29% at 1 mg lorazepam to 86% at 2 mg. Sixty-four percent of the subjects called 50 mg pentobarbital drug, whereas only 21% discriminated amphetamine as diazepam. The subjective effects of diazepam were typical of benzodiazepines. These results indicate that it is possible to train humans to discriminate diazepam and this discrimination is sensitive to differences in dose and appears specific to sedative-like drugs.

OPIOID DRUG DISCRIMINATIONS IN HUMANS. George E. Bigelow and Kenzie L. Preston. The Johns Hopkins University School of Medicine, Baltimore, MD.

In the animal laboratory use of behavioral drug discrimination procedures has proven quite useful in permitting characterization and categorization of the stimulus effects of drugs. The stimulus effects produced by drugs are thought to be related to subjective drug effects, which are, in turn, thought to be related to the likelihood of their being abused. The drug discrimination method has been especially useful in the study of opioid drugs; opioids with different receptor activites have been found to differ in their stimulus properties, and this has made it possible to use the drug discrimination procedure to infer differential receptor activity and differential abuse liability of different drugs. This presentation will provide an overview and summary of a number of different studies from our laboratory in which the drug discrimination procedure has been adapted and utilized with human volunteers to study the comparative clinical pharmacology of various opioid agonists, antagonists, and mixed agonist-antagonists, and to study features of the drug discrimination procedure itself. These studies have been conducted in a residential laboratory setting with experienced opioid-abuser volunteers; in some studies participants have been opioid-dependent methadone-maintained volunteers, while in other studies participants have been currently nondependent postaddict volunteers. With both populations opioid drug discriminations have been trained using either a three-choice procedure (Drug A vs. Drug B vs. Drug C) or a two-choice procedure (Drug A vs. Drug B), with one alternative being placebo. Subjects have then been tested under double blind conditions with a range of doses of the training drugs and a range of doses of various opioid mixed agonist-antagonists. Mixed agonist-antagonists were sometimes discriminated as agonist-like and sometimes as antagonist-like, sometimes as similar to one another and sometimes as dissimilar. The presentation will describe the profiles of effects observed, as well as the effects of subject characteristics, and the effects of training procedures. It is concluded that the drug discrimination methodology is adaptable to and readily learned by humans, and that the methodology is of substantial value in making subtle distinctions among compounds with overlapping profiles of activity.

SYMPOSIUM

The Analysis of Social Behavior: Drug Effects and Related Issues
Chair: *Thomas H. Kelley*, The John Hopkins University School of Medicine, Baltimore, MD
Discussant: *Larry D. Byrd*, Emory University, Atlanta, GA

AGGRESSION AND ANXIETY IN ANIMALS: BENZODIAZEPINES AND 5-HT RECEPTORS. Klaus A. Miczek and Alice Weerts. Tufts University, Medford, MA.

In preclinical experimental preparations, benzodiazepine-type anxiolytic drugs and 5-HT receptor antagonists may restore behavior that has been suppressed by punishment and attenuate distress calls in infants and adult submissive rodents and monkeys. Benzodiazepines as well as alcohol, but not anxiolytics acting on 5-HT receptors have proaggressive effects in male resident rats and dominant monkeys; at higher doses, all these drugs decrease aggressive behaviors. Beta-carboline derivatives and imidazobenzodiazepines antagonize the punishment- and distress-attenuating as well as proaggressive effects of alcohol and benzodiazepines. The selective and antiaggressive and distress-attenuating effects of 5-HT_{1a} agonists represent a most promising novel profile of effects.

ACUTE EFFECTS OF MARIJUANA SMOKING ON AGGRESSIVE, ESCAPE AND POINT-MAINTAINED OPERANT RESPONDING. Don R. Cherek, Ralph Spiga and Robert H. Bennett. University of Texas Health Science Center at Houston, Houston, TX.

Male subjects with histories of marijuana use were recruited for research. Marijuana cigarettes containing 0.00, 1.75, 2.57, 3.55 w/w delta-9-tetrahydrocannabinol were smoked using a paced puffing procedure. Signalled by stimulus lights, subjects took ten inhalations of two-second duration every thirty seconds, followed by a ten-second breath hold prior to exhaling. During each experimental day, subjects participated in six twenty-five-minutes sessions. The first session was conducted at 0830 prior to smoking, and the remaining sessions were conducted 0.0, .5, 2.0, 4.0 and 6.0 hr after smoking. Three distinct nonreversible response options levers A, B, C were provided. Responding on lever A was maintained by a fixed-ratio (FR) 100 schedule of point presentation (1 pt = 10 cents). Responding on levers B and C was engendered by subtracting points for the subject's counter. Point subtractions were attributed to a fictitious person ostensibly paired with the subject. Following a point subtraction, completion of a FR 10 on either lever B or C initiated a 125-sec interval during which point subtractions were not presented. Subjects were instructed that responding on lever B (FR 10) resulted in the subtraction of one point from their partner. Such responding was termed "aggressive" since it resulted in the presentation of an aversive stimulus to another person. Subjects were instructed that responding on lever C (FR 10) protected their counter for some period of time. Lever C responding was termed "escape" responding. Acute marijuana smoking resulted in slight decreases in point-maintained responding. Aggressive and escape responding were only clearly suppressed postintoxication (i.e., 2–4 hr after smoking). During intoxication (0–0.5 hr), some subjects increased

aggressive and escape responding. Differences between subjects will be related to measures of hostility taken at the beginning of the study.

DRUG EFFECTS ON HUMAN SOCIAL BEHAVIOR IN A RESIDENTIAL LABORATORY. T. H. Kelley, R. W. Foltin and M. W. Fischman. The Johns Hopkins University School of Medicine, Baltimore, MD.

The effects of amphetamine, diazepam and marijuana were measured on a wide range of human behavior, including social and verbal interaction. Eighteen healthy adult male volunteers gave written consent and resided in groups of three for 15 consecutive days in a residential laboratory designed for continuous behavioral observation. Each day between 1700 and 2330, subjects had access to private areas, consisting of small efficiency apartments equipped with eating, sleeping and bathroom/shower facilities, as well as common social areas, in which a variety of recreational activites, including board games and videotaped movies were available. Six subjects received oral doses of amphetamine (0 or 10 mg/70 kg b.i.d., at 0930 and 1630); and six subjects received oral doses of diazepam (0, 5 or 10 mg/70 kg, at 0930 and 1630); and six subjects smoked marijuana cigarettes (0 or 2.7% THC, w/s, q.i.d., at 0945, 1315, 1700 and 2030). The six subjects in each drug condition were divided into groups of three. One group of three received placebo doses during days 2–4 and 8–10, and active doses during days 5–7 and 11–13. Dose order was counterbalanced in the second group. No drug doses were administered on day 1, and both groups received placebo on days 14–15. All daily doses were either placebo or active, and all three were administered in an ascending order. The distinction between the amount of time subjects spent in social contexts and the amount of verbal interaction that occurred within social contexts will be described, and drug effects on both of these dimensions of social behavior will be evaluated. Marijuana had no effect on the total amount of time subjects spent in social contexts. However, while in social contexts, subjects engaged in less verbal interaction following marijuana administration. Amphetamine's effects were dependent on baseline levels of verbal interactions, and diazepam's effects are still under evaluation.

DRUGS AND HUMAN SOCIAL INTERACTION: ARE THERE "SOCIOTROPIC" DRUG EFFECTS? Ralf Kohnen. University of Erlangen-Nuremburg, FRG.

"Sociotropic" drug effects are defined as "drug-induced changes of the social behaviors of individuals." Based on a review of experimental studies which evaluated social interactions as target behavior of different drugs' actions, the paper distinguishes between ("sociotropic") and secondary (i.e., "psychotropic") drug effects on social behavior. The term "sociotropic" implies that a class of drugs ("sociopharmaca") might exist which specifically influences social behavior. To prove this model of sociotropic drug effects, the results of three experimental studies are summarized. Social behavior was evaluated in interactive roleplay interactions (flirt, quarrel) and in everyday life conversations. Behavioral measures of speech behavior (on-off patterns of speech in different levels of integration) as well as ratings of behavior and mood demonstrate different influences of psychotropic drugs like benzodiazepines and sociotropic drugs like serotonin antagonists (experimental drugs). Changes in behavioral measures are predominantly seen with the serotoninergic drugs: in socially handicapped volunteers, conversational activities in everyday life (e.g., involvement in talks) increase, compared to placebo; in role-play situations, socially competent behavior like interruptions and double talks in the quarrel task as well as short utterances in the flirt situation was seen more frequently in drug conditions than under placebo treatment. Benzodiazepines and sedatives did not show any remarkable behavioral effect, however they influence processes of social perception. The answer to the title's question is: There are sociotropic drug effects. The proposed model proves to be suitable for further steps in human sociopharmacology, which include metaanalysis of available data from the sociotropic perspective. Methodological desiderata were outlined, and some speculations about an increasing importance of this scientific domain are enclosed.

SYMPOSIUM

Issues in Psychopharmacology Training for Clinical, Counseling and Developmental Psychologists
Chair: *M. Marlyne Kilbey*, Wayne State University, Detroit, MI

INTRODUCTION.

This symposium will cover current issues in psychopharmacology training for clinical, counseling and developmental psychologists. A description of the range of current psychopharmacology training will be given and evaluated in light of current clinical research and practice with clients who need and/or are receiving psychoactive medications. Issues of graduate, internship and postdoctoral training, continuing education, and retraining will be addressed from the perspective of necessary and/or model curriculum to prepare practitioner/researchers to treat clients who need or receive psychoactive medication, evaluate medication regimes, and develop medications for treatment of psychological disorders including substance abuse.

CHILD CLINICIANS NEED FOR PSYCHOPHARMACOLOGY TRAINING. Russell Barkley. University of Massachusetts Medical School, Worchester, MA.
(Abstract not available)

SURVEY OF GRADUATE TRAINING IN PSYCHOPHARMACOLOGY. M. Marlyne Kilbey. Wayne State University, Detroit, MI.
(Abstract not available)

PSYCHOPHARMACOLOGY: CLINICAL RESEARCH AND THERAPY. Mark Goldman. University of South Florida, Tampa, FL.
(Abstract not available)

PSYCHOPHARMACOLOGY: A PLAN FOR SPECIALTY TRAINING FOR CLINICAL PSYCHOLOGISTS. Allan G. Barclay. Wright State University, Dayton, OH.
(Abstract not available)

A MODEL CURRICULUM IN PSYCHOPHARMACOLOGY. Oakley S. Ray. Vanderbilt University, Nashville, TN.
(Abstract not available)

SYMPOSIUM

Smoking Cessation and Weight Gain: Underlying Mechanisms and Treatment Outcome. Chair: *Scott J. Leischow*, Palo Alto Center for Pulmonary Disease Prevention, Palo Alto, CA
Discussant: *Maxine Stitzer*, Johns Hopkins University Medical School, Baltimore, MD