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