BEHAVIORAL PHARMACOLOGY AND THE SEARCH FOR AN AMETHYSTIC AGENT Mark Galizio Department of Psychology, University of North Carolina at Wilmington

The quest to discover an "amethystic drug," a specific antagonist for the central nervous system effects of alcohol, has been an important part of contemporary research on alcohol pharmacology In recent years a number of agents have been proposed to reverse alcohol's actions including naloxone, picrotoxin, thyrotropin-releasing hormone, and most currently benzodiazepine inverse agonists such as RO 15-4513 The techniques of behavioral pharmacology have played an important role in the evaluation of the interaction of these drugs with alcohol, and these techniques are reviewed along with the outcomes of such studies

MARIJUANA AND BEHAVIORAL CONTINGENCIES R W Foltin Department of Psychiatry and Behavioral Sciences, The Johns Hopkins University School of Medicine

Twenty-four adult male research volunteers, in eight groups of three subjects each, lived continuously in a residential laboratory for up to 25 days Under contingency conditions, time spent engaging in a low-probability activity earned time that could be spent engaging in a higher probability activity When contingency requirements were imposed on private work activities, smoked marijuana significantly *increased* the amount of time spent engaging in the low-probability activity compared to placebo conditions. In contrast, when contingency requirements were imposed on recreational activities, smoked marijuana significantly *decreased* the amount of time spent engaging in low-probability activity. Smoking marijuana had no effect on the amount of time spent engaging in the contingent work or recreational activity.

INTEGRATION OF BEHAVIORAL AND BIOLOGICAL FACTORS IN SMOKING A PEEK INSIDE THE BLACK BOX Ovide F Pomerleau Behavioral Medicine Program, University of Michigan School of Medicine

Cigarette smoking is a highly efficient method for nicotine self-administration The persistance of such a behavior in the face of serious health consequences and societal disapproval constitutes a major challenge for applied behavior analysis A strictly pharmacological explanation (smoking as relief of nicotine withdrawal) is not fully satisfactory, as most cigarettes are smoked in the absence of observable withdrawal signs Similarly, strictly psychological explanations (smoking as a compelling habit) seem incomplete, as, depending on conditions and nicotine dose, smoking behavior produces widely varying reinforcing consequences An examination of the neuroregulatory impact of nicotine, with effects on cholinergic, catecholaminergic, and endorphinergic activity, may help resolve the problem The resulting integration of biological and behavioral factors provides a more comprehensive and satisfactory explanation than is possible with unidimensional models

TRANSITIONS IN CONCURRENT RESPONDING EF-FECTS OF d-AMPHETAMINE J M ZIRIAX University of Rochester, Department of Biophysics

d-Amphetamine altered response patterns during concurrent schedule transitions in monkeys Both schedule components were stochastic reinforcement of waiting schedules Steady-state performance was characterized by visits of 5 to 10 seconds on the SRW 80s and 15 to 35 seconds on the SRW 20s An unsignaled exchange of the schedule values occurred 15 minutes into a transition session During control transitions, long visit durations were rapidly replaced by short visits, the shift from short to long visits developed more slowly Amphetamine increased interresponse times and visit durations, and accelerated the development of long visits within the transition session

THE REINFORCING FUNCTIONS OF DRUGS AND ASSESSMENT OF ABUSE LIABILITY J V Brady The Johns Hopkins University School of Medicine

The contributions of behavioral pharmacology to the assessment of drugs for dependence potential and abuse liability have complemented traditional biochemical/physiological procedures for characterizing structure-activity relationships and provided a more comprehensive basis for evaluating a drug's functional properties The resulting advances in knowledge of drug actions, and particularly in research technology, have made possible an operational approach to pharmacological assessment of abused drugs and called attention to the need for reappraisal of traditional concepts and definitions in the field The development of a unifying conceptual framework must encompass the data base that focuses upon the analysis of behavior advantaged by the strong empirical influence of the experimental laboratory The most important point of contact between the experimental analysis of behavior and substance abuse is the demonstrated relationship between the pharmacological properties of drugs and their stimulus functions in behavioral interactions

THE BEHAVIORAL EFFECTS OF CHLORDIAZEPOX-IDE, BUSPIRONE, GEPIRONE AND BCCE ON RE-SPONDING MAINTAINED BY INTRAMUSCULAR COCAINE INJECTION OR FOOD PRESENTATION IN THE SQUIRREL MONKEY M A Nader and J E Barrett Department of Psychiatry, Uniformed Services University of Health Sciences

Lever pressing of squirrel monkeys was maintained under a second-order schedule [FR10(F13' S)] of either food presentation or intramuscular cocaine injection Chlordiazepoxide (0 3-5 6 mg/kg), increased responding maintained by food at doses that had no effect on or decreased responding maintained by cocaine, BCCE (0 003-0 03 mg/kg), an inverse agonist at benzodiazepine receptors, decreased responding in all subjects irrespective of the maintaining event. The novel anxiolytic buspirone and its analogue gepirone (both at 0 003-0 03 mg/kg), compounds active at 5-HI₁₄ receptors, increased cocaine-maintained responding but only decreased responding maintained by food These results show that the effects of buspirone and gepirone can depend upon the maintaining event and suggest the involvement of serotonin in cocaine-maintained behavior (Supported by PHS Grant DA-02873)

OPERANT BEHAVIOR MODELS OF LEARNING AND MEMORY DRUG EFFECTS D M Thompson Georgetown University Medical Center

Repeated acquisition is an operant technique that has been used to study drug effects on "learning" in individual subjects In one series of studies, monkeys acquired a different four-response chain each session in one component of a multiple schedule. In the other component (performance), the response chain was the same each session In general, acquisition was more sensitive to the dose-related disruptive effects of drugs (e g, *d*-amphetamine and cocaine) than was performance More recent research has shown that phencyclidine (PCP) disrupts the retention of an acquired response chain, as measured by percent "savings" in errors to criterion, at retention intervals up to several hours

ANALYSIS OF BEHAVIORAL EFFECTS OF DRUGS Jeffrey M Witkin Addiction Research Center, National Institute on Drug Abuse

Behavioral pharmacology has the potential for playing a major role at the forefront of neurobiology Its alliance with the experimental analysis of behavior endows behavioral pharmacology with the ability to address the neurobiological underpinnings of behavior and to provide a comprehensive understanding of the manner in which drugs affect behavior The foundation for this endeavor is a coherent evaluation of behavioral mechanisms of drugs' action, a goal attainable only by insightful experimentation and appreciation of behavior as an appropriate level of analysis Convergent information on the specificity of behavioral effects of drugs from a host of experimental approaches will eventuate in a refined understanding of drug action and its behavioral substrate

COCAINE TOLERANCE UNDER VARIABLE SCHED-ULES OF REINFORCEMENT Marc N Branch University of Florida

Pigeons were trained to peck a key under threecomponent multiple schedules of food presentation in which components consisted of either random-interval schedules or random-ratio schedules. The random-interval schedule parameters were 10 sec, 30 sec, and 125 sec, the random-ratio schedule parameters were 5, 25, and 125 Following determination of acute effects of cocaine hydrochloride (1 0–13.0 mg/kg), a dose that reduced pecking rates was administered before each daily session. Tolerance developed to the ratereducing effects, and the degree to which tolerance developed tended to depend on the schedule parameter under the ratio schedules whereas it tended to be independent of schedule parameter under the interval schedules.

ACQUISITION AND PERFORMANCE OF RESPONSE CHAINS MODULATION BY ENVIRONMENTAL AND PHARMACOLOGICAL FACTORS Warren K Bickel and Stephen T Higgins University of Vermont

The study of response chains has generated a great deal of data which has contributed substantially to knowledge of the ways behavioral and pharmacological factors influence the acquisition and performance of response chains However, this research has not adequately addressed how response chains should be viewed or how the differential effects of variables on the acquisition vs. performance of response chains fit within our understanding of the ways environmental and pharmacological factors influence behavior Some have suggested that the acquisition and performance of response chains differ in the degree of stimulus control However, a critical analysis of research findings to date suggest that the acquisition and performance of response chains should be viewed as the formation and subsequent maintenance of response units. This reanalysis of the data were discussed with respect to future research and how it contributes to characterizing the features of response units

REAL ESTATE IN BEHAVIORAL ANALYSIS. REIN-FORCING "PROPERTIES" OF STIMULI John R Hughes, Stephen T Higgins and Warren Bickel Human Behavioral Pharmacology Laboratory, Departments of Psychiatry and Psychology, University of Vermont

According to our literature search, the term "reinforcing properties" is becoming more common in articles on drugs as reinforcers In this paper, we argue that the term is problematic because it suggests a stimulus has inherent and immutable characteristics that are responsible for its ability to serve as a reinforcer Yet, one of the basic findings of the experimental analysis of behavior is the function of a stimulus depends on history and present context We also discuss possible reasons for the increased use of the term reinforcing properties, eg, the increased popularity of theories that the reinforcing effects of drugs are due to their molecular structure As an alternate noun to the term reinforcing properties, we suggest the terms "reinforcing efand "reinforcing function" better describe the fects" dynamic function of stimuli

DRUG AND TOXICANT EFFECTS ON DURATION DISCRIMINATION PERFORMANCE Stephen A Daniel Department of Psychology, Mercy College

The dose-effects of drugs and toxicants on behavior controlled by conditional stimuli of differing durations will be reviewed The effects of stimulant, sedative-hypnotic and hallucinogenic drugs and drug combinations, as well as neurotoxicants, such as acrylamide and lead on these discretetrial procedures will be discussed. In addition, non-pharmacologic procedures will be examined, such as varying discrimination difficulty, methods and species comparisons and other manipulations to. (1) measure the effects of these procedures on dose-effect relationships and (2) help elucidate behavioral mechanisms of action. The advantages of using these procedures in behavioral pharmacology and toxicology will be explored

RELATIONSHIP BETWEEN REINFORCER MAG-NITUDE AND RELATIVE REINFORCING EFFECTS STUDIES WITH PENTOBARBITAL AND FOOD R. A Meisch and G A Lemaire University of Minnesota

Two paradigms were used with rhesus monkeys to assess the relative reinforcing effects of different quantities of pentobarbital. Different quantities of pentobarbital were tested at each of several interval and fixed-ratio schedules. As the size of the intermittent schedule increased, fewer drug deliveries were obtained However, the percent decrease was greatest at the lowest drug quantity and became progressively less with increases in drug quantity Thus, relative reinforcing effects rose with increases in drug quantity (either drug concentration or drug volume) Similar studies of rats' food reinforced behavior yielded results that were consistent with these drug self-administration studies Relative reinforcing effects were directly related to reinforcer magnitude In a second paradigm different quantities of pentobarbital were made available under identical concurrently