



## Common Processes in Habitual Substance Use: A Research Agenda (1977)

Pages  
53

Size  
5 x 8

ISBN  
0309346428

Committee on Substance Abuse and Habitual Behavior;  
Assembly of Behavioral and Social Sciences; National  
Research Council

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# Common Processes in Habitual Substance Use: A Research Agenda

COMMITTEE ON SUBSTANCE ABUSE AND HABITUAL BEHAVIOR  
ASSEMBLY OF BEHAVIORAL AND SOCIAL SCIENCES

NATIONAL RESEARCH COUNCIL

NATIONAL ACADEMY OF SCIENCES  
WASHINGTON, D.C. 1977

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NOTICE

The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the Committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

**COMMON PROCESSES IN HABITUAL SUBSTANCE USE**

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## PREFACE

There has been increasing public recognition of the need to examine and understand the complexities of substance use, abuse, and addiction. While research, prevention, and treatment efforts have been applied to specific substances and substance users, less attention has been given to the common processes among different forms of abuse and addiction. Supported by the National Institute on Drug Abuse, the Committee on Substance Abuse and Habitual Behavior in the Assembly of Behavioral and Social Sciences of the National Research Council was formed in 1976 to examine these and related issues. The Committee's major concern has been to examine the feasibility and advantages of using an integrative approach to study habitual substance use.

The formation of the Committee was preceded by two related activities. In July 1975, the National Institute on Drug Abuse sponsored a Conference on Substance Abuse. This conference included discussions on the underlying behavior patterns and motivations for substance abuse, the comparability of methods to reduce substance abuse, and the advantages of using a shared conceptual framework for studying abuses involving different substances. These discussions were expected to determine the potential of behavioral analysis in developing substance abuse research and in specifying treatment directions.

Later that year, an Ad Hoc Meeting on Addiction and Habitual Behavior was convened by the Assembly of Behavioral and Social Sciences. With participants and guests

encompassing a wide range of multidisciplinary specialists,\* the meeting covered a number of conceptual, theoretical, and policy issues related to addictive behaviors. Discussion focused on approaches for synthesizing existing studies on the etiology, treatment, and outcomes of various addictive behaviors. Participants recommended that such a synthesis could best be accomplished through a broad multidisciplinary framework ranging from biology to anthropology.

The recommendations reached at these meetings were influential in determining both the composition of membership and the scope of work of the Committee on Substance Abuse and Habitual Behavior. To gain an integrated, comprehensive view of problems influencing habitual substance use, members were drawn from a wide range of disciplines and include scientists whose research spans a variety of substances. Considering the implications arising from research on common processes in habitual substance use became one of the Committee's major responsibilities--recognizing that this approach has not yet become embedded in societal attitudes and policies. For example, while it is generally assumed that heroin addiction and alcoholism are both forms of substance abuse, society deals very differently with each type of abuse. The heroin user may be imprisoned, while the alcoholic is often treated as a victim of disease, despite considerable evidence that the two problems are rooted in common patterns of habit formation. Moreover, there appear to be similarities between habitual use of heroin, alcohol, and other drugs and the less dramatic forms of habitual activity such as smoking, overeating, overworking, gambling, and obsession with sports.

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\*Howard Becker, Northwestern University; Peter Bourne and Thomas Bryant, Drug Abuse Council; John Deering, National Institute on Alcohol Abuse and Alcoholism; Daniel X. Freedman, University of Chicago; John Gagnon, State University of New York; James Isbister, Alcohol, Drug Abuse, and Mental Health Administration; Elliott Liebow, National Institute of Mental Health; William Pollin, National Institute on Drug Abuse; Stanley Schachter, Columbia University; Donald Scherl, Judge Baker Guidance Center; Abraham Wikler, University of Kentucky; Norman Zinberg, Cambridge Hospital.

The Committee limited the initial area of its study to the etiology and maintenance of habitual behavior involving food, alcohol, tobacco, and a wide range of both licit and illicit drugs. Since even this task covers such a vast domain, preventive and treatment strategies (as well as analysis of substance use policies) were excluded as matters of emphasis in the first phase of the Committee's work. Nonetheless, many implications for prevention and treatment policy stem from reviews of common processes in habitual substance use.

To provide a broad view of current and future research directions, the Committee convened a three-day Conference on Commonalities in Substance Abuse and Habitual Behavior in March 1977. As a basis for discussion, the Committee selected 14 significant papers on micro- and macro-environmental topics in habitual substance use, which were circulated to participants before the conference, and invited their authors and a group of other distinguished scientists to discuss the subjects. (See the list of conferees, Appendix A.) Conferees represented disciplines ranging from genetics to law and ethics, and their research encompasses theoretical and empirical approaches to numerous substances and habitual behaviors.

At the conference, each author of the 14 papers presented updated aspects of the published work, and a designated discussant followed with a response. In order to bring a variety of perspectives to bear on the papers, each presenter-discussant pair represented different scientific disciplines or specializations in different substance-specific properties and their behavioral outcomes. Each of the five conference sessions was organized to involve internal and external factors that influence habitual substance use. (See the agenda, Appendix B.) The interchange between presenters, discussants, and Committee members was expected to achieve the goals of information exchange, theoretical challenge, and synthesis of knowledge on the etiology and maintenance of habitual substance use.

This report presents the Committee's synthesis of the conference and its conclusions on identifiable common processes and characteristics in habituation, and on a research agenda for further study. (The proceedings of the conference are found in Appendix C [bound separately].)

## INTRODUCTION

In the past decade, increasing personal and public costs have been associated with habitual behavior involving substances used in excess of socially defined norms. The limited effectiveness of public policy and programs to deal with the adverse consequences of substance use has resulted in sporadic empirical and theoretical research on methods to prevent substance abuse, slow its acceleration, and treat its victims.

The Committee on Substance Abuse and Habitual Behavior was organized in order to (a) synthesize current research on a wide array of substances, such as food, alcohol, tobacco, barbiturates, and opiates and other licit and illicit drugs, and habitual behaviors, such as smoking, drinking, and overeating, (b) identify implications of this research for public policies, and (c) develop agendas for future research.

Research on problems of excess substance use, whether pharmacological, behavioral, or social, has focused primarily on the properties and characteristics of the specific substance used and the variables affecting its use. This approach has produced a large data base and a variety of theories about the properties of specific substances and about certain user groups. Less attention has been given to the interaction of the substance with the psychological characteristics of the individual (the "set") and the setting of use. Also, little attention has been given to those processes and characteristics that are common to habitual substance use regardless of the unique qualities of the consumer and the product consumed. These common processes and characteristics are called

commonalities in this report. Interest in exploring these commonalities has accelerated with the accumulated evidence of the use of more than one substance and the possibility that in some situations one type of habitual behavior may be substituted for another. For example, there is evidence that large numbers of U.S. veterans of the Vietnam War, when rehabilitated from heroin use, become alcoholics.

No single general theory or concept has been accepted to explain the etiology, maintenance, and termination of habitual substance use. Similarly, no single general model of behavior has been accepted to explain the common patterns characterizing habits that come to be considered harmful to the individual and society. More definitive research is needed to understand the physiological, psychological, and social interrelationships that determine how habits are formed, maintained, and terminated.

Patterns of behavior--in eating, taking drugs, work, or play--reflect a person's style of life. Such patterns may be protective, essential to coping with daily routines of life, but they can also lead to problems: organic diseases; behavior disorders; interpersonal difficulties with family, colleagues at work, or members of social groups; and social problems, such as unemployment and crime. Behavior patterns may be shaped by social and peer group pressures. Those that fit societal norms are accepted, while those that do not may be considered deviant. In effect, habit formation can be viewed as social influences modulating individual motivations.

Habits can also be viewed as formed neither by social stimuli nor cognitive learning but by physiological responses to emotional, affective events. Opiate addiction illustrates this view. Some opiate users experience pleasurable moods and a euphoric rush after the first intravenous injection, an affective response determined by the effects of the drug. However, with continued use at short intervals (i.e., the forming of habitual behavior), the original affective response is diminished; and if withdrawal or discontinuation occurs, even for a short time, craving and aversive affective states recur. With continuous use, the user's motivation becomes not to gain pleasure but relief. This pattern of habit formation has been generalized as the opponent-process theory: an individual's reaction to a stimulus, be it pleasant or

aversive, is opposed by mechanisms of the central nervous system that both reduce the intensity of the reaction and convert it to its opposite form.

Most affective stimuli that lead to addiction seem to work by some variant of the opponent-process theory, with the actual intensity of the physiological or psychological response depending on the duration and frequency of the stimulus. The opponent-process theory may be useful in analyzing various forms of addiction: to opiates, hallucinogens, drugs such as alcohol and tobacco, work, gambling, sports, or sexual activity.

The value of any theory--or combination of theories--is measured by the insights gained in understanding the underlying causes of habit formation that produce the varied forms of habitual substance use. But weaving together into a comprehensive theory the physiological, psychological, social, and economic elements that enter into people's lives is difficult. Moreover, the importance of these interacting elements varies according to each person's actual experience with using the substance and his or her contact with others, both addicts and non-addicts.

## THE SEARCH FOR COMMONALITIES

The conference was designed to provide an interdisciplinary approach to the issue of commonalities in the etiology and maintenance of habitual substance use: 1) to determine whether the identification and analysis of commonalities is a useful approach for learning about habitual substance use; 2) to identify commonalities; and 3) to develop an agenda for future research.

### Usefulness of the Commonalities Approach

In the opinion of the Committee, existing concepts and theories suggest the potential usefulness of an integrative approach. More research is needed, however, to define the differences among substances as well as to identify the commonalities and to increase knowledge of the interactive mechanisms and processes involved in habituation and addiction. Much of this need involves measuring the scope of differences within and among various substances and their users. Rather than a global study of "drug use," comparisons among various types of substance use (such as foods, heroin, marijuana, tobacco, and alcohol) are needed.

It is also necessary to distinguish etiological factors influencing the initiation and extent of use (for example, social drinking, problem drinking, alcohol abuse, alcoholism) and categories of use; there are, for example, many etiologies of "alcoholism." Similarly, one should approach studies of "obesities" rather than "obesity." By searching for and measuring analogous mechanisms among different categories of habitual substance use, commonalities can be identified. The search for commonalities may also be of value in identifying individual differences among substances and substance users.



### Identification of Commonalities

In habitual substance use, an open system develops in which an individual is affected by interactions between internal and external stimuli. The Committee has identified six major elements in the interactive process of habitual substance use.

Predisposition. Genetic, personality, nutritional, and sociocultural variables influence individual predispositions to habitual substance use.

Social setting. Social settings either enhance or inhibit individual predispositions for learning acceptable and unacceptable substance use.

Reinforcement. Substance use is reinforced through interactive pharmacological, nutritional, neurological, psychological, and sociocultural processes.

Tolerance and physiological adjustment. Levels of tolerance to the effects of a substance are achieved through interactive internal body systems that respond to external stimuli. The need to attain homeostasis is satisfied through external forces, that is, continued substance use. Repeated use can also result in an altered homeostatic state that neutralizes the effects of the substance. The altered state requires continued substance use to prevent a disruption of the system.

Withdrawal. The withdrawal process occurs when the amount of the substance is insufficient to maintain altered homeostatic states. When dysphoria is a prominent aspect of the withdrawal process, the individual becomes motivated to seek relief through renewed or continued substance use.

Public policy. Habitual substance use by individuals and groups has effects on public policy; at the same time, public policies influence the potential for initiating, maintaining, and terminating habitual substance use.

## RECOMMENDED RESEARCH AGENDA

The development of this research agenda requires a definition of the scope of topics, a common language, and a conceptual theme.

In recommending future issues and questions for study, the Committee does not specify who should support or conduct the research. While some of the research topics might be supported by the National Institute on Drug Abuse, others might more appropriately be supported by other governmental or non-governmental agencies.

Similarly, while specific disciplines are identified with researchable topics in the agenda, scientists from other disciplines may be stimulated to consider these issues. We hope that a wide range of specialists will be attracted to items in the research agenda. Furthermore, while there are numerous and provocative issues pertinent to specific disciplines, the multi-causal nature of habitual substance use leads us to highlight contributions that are dependent on the integration of biological, behavioral, and sociocultural concepts and empirical approaches. The research agenda we propose therefore gives priority to issues requiring multi-disciplinary attention.

### Scope of Research Topics

The topic of commonalities in habitual substance use is so broad that a very large number of research questions can be identified. In developing a research agenda, the Committee limited the scope of its recommended research questions to issues and topics raised at its conference--the etiology, maintenance, and termination of habitual processes.

### Terminology

This agenda employs standard terminology to facilitate research on commonalities and to avoid the ambiguity or confusion stemming from differential meanings attributed to various terms. The term *habitual substance use* includes use, abuse, and addiction; it is a process originating with a person's perceived need for a product or activity, followed by acquisition, consumption, and the experience of effects. This experience may lead to (1) a system of *controlled use* of the substance(s), in which no perceived harm is defined by user or society; (2) *substance abuse*, in which habits in excess of social norms become apparent to the user or society; or (3) *addiction*, in which physiological or psychological dependence develops that is considered detrimental to the individual or society.

### Conceptual Theme

The concept of control in the process of habitual substance use is the major theme of the research agenda. *Control* is a restraining, regulating, or directing influence, whether its source is endorphins in the brain governing pleasure/pain syndromes, brain neurotransmitters, and central nervous system responses; phenotypic or genotypic susceptibility to specific substances or activities; personality and behavioral differences in learning; or predisposing and reinforcing elements in the social environment. Because individuals do not exist outside an environmental milieu, heritability and conditionability, like personality and culture, interact to influence initiation, direction, and duration of habitual substance use. Therefore, the full spectrum of biological and environmental control mechanisms must be investigated in a comprehensive study of habitual substance use.

The Committee's recommendations for research focus on multi-causal factors in the etiology, maintenance, and termination of habitual substance use. Our research agenda draws particular attention to interactive internal and external controls that influence patterns of habitual substance use.

*Internal controls* refer to conditions and events "within the skin" that govern response to external stimuli: the manner in which each body system functions as an integral unit as well as the interactions between systems. Genetic, biochemical, neurological, physiological, pharmacological, and motivational factors are those of major concern. *External controls* refer to conditions and events "outside the skin" that influence internal homeostatic properties: the manner in which variables in social and physical environments interact with an individual's behavior and personality development. For example, labeling and regulation influence the access to and availability of substances, while the learning of substance use behaviors occurs through interactions in diverse social settings.

Two sets of questions are central in examining the interplay between internal and external factors. The first set pertains to individual decision making as the result of interactive internal and external control mechanisms.

How does a user decide what substance to consume, when to consume it, and how much is enough to consume? Under what circumstances and through what processes does a person decide that there has been enough use, either temporarily or permanently?

The second set pertains to the impact that habitual substance use by individuals and groups has on the public stance toward degrees of substance use.

What should public policy be in regard to various substance uses and users? Who decides, and on what basis are policy decisions made? For example, while no one would suggest curtailing consumption of all food to zero, one might suggest this goal for certain foods and drugs. What criteria are employed in the decision to exert control over specific products? Who determines the criteria? How are regulations developed and implemented? What effect do regulatory practices have on national health and well-being?

The Committee's recommended research agenda is in two parts: priority topics for multidisciplinary investigation and a four-part classification of disciplinary research; both draw attention to gaps in the knowledge of internal and external control mechanisms influencing habitual substance use.

#### PRIORITIES IN THE SEARCH FOR COMMONALITIES

The Committee has identified five research priorities, without any implications of order of importance:

- Individual differences
- Cultural and class differences
- Multiple substance use and substitution
- Substance use policies
- Controlled use of substances

#### Individual Differences

The emphasis on research on commonalities should not obscure research on specific properties of a substance and specific characteristics of individual users. Research perspectives on the properties of substances and the behaviors of substance users should be developed and refined in order to describe individual differences and their environmental and genetic bases in activities of consumption and their consequences. Research is needed on a wide range of topics: perception of substance needs; motivation to initiate, discontinue, or modify use; innovative preventive and treatment modalities; and differences in substance properties, major sites of action, metabolism, tolerance, reinforcement, and withdrawal.

#### Cultural and Class Differences

Patterns of habitual substance use differ among people in relation to their social or socioeconomic class; their racial, national origin, and ethnic identity; and their sex and age. Investigation is needed to determine

ways in which to describe group differences, why differences exist, and how differences serve to identify explanatory variables of habitual substance use.

What biological, psychological, social, or cultural factors differentially predispose groups to greater or less involvement with substances? How, for example, are economic deprivation and diet related to stimulus deprivation and differential response to substances? In what settings do social norms provide approval of controlled use, excess use, or addiction to substances? What criteria are employed to identify population groups for preventive and treatment intervention? How applicable are intervention strategies for these groups? To what extent is it possible to implement flexible intervention programs responsive to specific population needs?

Obtaining such data requires adequate indicators--measures of cultural and class differences in substance use. Currently used indicators (e.g., drug-related crime, morbidity, mortality) reflect class, age, or other biases. How can reliable, unbiased indicators be developed?

#### Multiple Substance Use and Substitution

It is apparent that some people frequently engage in the use of more than one substance (multiple substance use). Attempts to withdraw or terminate the use of a particular substance and motivation to experiment often result in transfer to the use of one or more other substances. More research is required on substitution and the use of more than one substance. What combinations of substances are used concurrently, and in what situations? In what ways does the use of more than one substance influence the substitution of one product for another? How do substance-specific properties, the amount of the substance used, the individual's responses to substance action and settings for substance use, cultural values, and the personality of the user affect decisions on when and how to substitute or combine substances? Are certain population groups more prone to engage in substitution or the use of more than one substance? To what extent is this tendency related to sex, age, ethnicity, or socioeconomic status? How do regulatory policies (such as prohibition) as well as fluctuations in availability or price affect quantity and quality of patterns of consumption?

### Substance Use Policies

In view of the evidence that alcohol and tobacco are related to a variety of diseases and that opiates are relatively less harmful to body organs, why are the former licit and the latter illicit? Health effects are clearly only one of the factors considered in determining regulation and control of foods and drugs. What other aspects of social and legal systems determine public policies on substance use? Critical research is needed to determine the criteria applied in regulating foods and drugs and in labeling their users as a deviant or not. How do social and legal attitudes toward substances evolve? What intrinsic qualities of foods and drugs and their effects separate licit from illicit substances? To what extent are treatment and prevention policies based on the physical, psychological, social, or economic consequences of substance use? How are such variables weighted in the decision-making process?

### Controlled Use of Substances

Each of the research priorities mentioned above involves some element of control, either internal or external. Because the levels of control exerted by each individual and society determine patterns of substance use and their acceptability or unacceptability, more research is needed to define the components of controlled substance use. Under what circumstances are basic genetic predispositions and biological mechanisms more potent than external environmental stimuli? How are the pharmacological properties of the substance, the personalities of the users, and the social rituals that accompany use related to controlled use? How do micro-social controls exerted by small groups in society differ from macro-level legal and institutional controls? To what extent can informal sanctions produce controlled use of specific substances? Under what circumstances do societies enable individuals to use substances in a controlled manner? How do these and other variables influence regulatory policies? What similarities and differences exist in micro- and macro-level controls?

Each of the five priorities includes interacting components that must be addressed by specific disciplines. For example, to understand controlled use of substances, it is necessary to investigate pharmacological and biological effects of substances, personality variables influencing motivation for use, interactions within a social setting in which substances are used, and how public policies facilitate or inhibit predispositions to use.

#### A FOUR-PART RESEARCH TAXONOMY ON COMMONALITIES

To gather such information in a systematic manner, a series of research questions applicable to these priorities were generated from conference discussions; these are presented in four parts based on traditional disciplinary lines:

- Biological bases and effects of habitual substance use
- Conditioning, learning, and behavioral bases of habitual substance use
- Sociocultural and situational aspects of habitual substance use
- Prevention, treatment, and public policies in habitual substance use

Each part outlines specific disciplines; problem areas; and major questions, grouped under two or more central topics. Substantial overlap exists among the four parts; some questions recur in a number of places. This overlap and repetition reflects the difficulty of identifying discrete explanatory variables in as complex a subject as habitual substance use and suggests that a multi-factor rather than a single-factor theory may be necessary to explain habitual substance use.



RESEARCH TAXONOMY ON COMMONALITIES  
IN SUBSTANCE USE AND HABITUAL BEHAVIOR

Part I Biological Bases and Effects  
of Habitual Substance Use

Disciplines

Biochemistry, genetics, pharmacology, physiology, psychobiology

Problem Areas

Genetic perspectives and methodologies, prenatal substance use behaviors and morphogenesis, pharmacological and nutritional effects on neurotransmitters, opiate receptors, pleasure/pain

Major Research Questions

*Genetic Factors*

What genetic basis exists for predisposing individuals or population groups to excess use of alcohol, tobacco, and other drugs and to excess caloric intake? What is the genetic basis for individual differences in substance-seeking behaviors and individual response to substance use?

What methodology should be emphasized in describing genetic components of habitual or addictive behaviors?

In what ways can genetic perspectives and methodologies inform research on environmental variables?

*(Part 1 continued)*

*Prenatal Influences*

The phenomenon called fetal alcohol syndrome refers to the links between prenatal alcohol drinking behavior and morphogenesis. Similar adverse effects on the fetus have been associated with a mother's eating, smoking, and other drug-using behaviors.

To what extent does alcohol consumption in pregnancy produce adverse effects on the fetus?

To what extent do individual differences exist among mothers and among fetuses in susceptibility to adverse effects of alcohol, nicotine, and other drugs?

How do such variables as health and nutritional status, eating behavior, and drug-use behaviors in pregnancy interact with alcohol to increase susceptibility to fetal damage? To what extent can these early abnormalities relate to an individual's later developmental, intellectual, or behavioral problems?

*Pharmacological and Physiological Effects of Foods and Drugs*

Recent neuropharmacological findings provide evidence that receptor sites for opiates exist in the neural tissue of the brain and that endorphins (an endogenous class of compounds) bind to these receptor sites.

What mechanisms of action do these or similar compounds perform in non-opiate, addictive-like behavior involving excessive use of substances such as alcohol, tobacco, and food?

What is the role of enkaphaline (one of the peptides responsible for neurotransmission of information in the brain) in determining ability to perceive and tolerate pain?

What potential implications for controlled substance use are associated with animal studies that map and measure neurotransmitter receptors and subsequent food and drug action at the receptor site?

What pharmacological properties of opiates, alcohol, tobacco, and other substances are responsible for differential physiological effects?

At what level of consumption do alcohol and other drugs become harmful to the brain and other body organs and by what mechanisms?

*(Part 1 continued)*

What are the difficulties in isolating those harmful ingredients in tobacco leading to diseased states in body organs?

Since food is the ultimate energy source for bodily function, what synergistic, aversive, and homeostatic effects arise through excess caloric intake?

Nutritional status is influenced by consumption of opiates, alcohol, tobacco, and other drugs.

In what ways do eating patterns and subsequent nutritional statuses influence pharmacological response to opiates and other drugs and physiological outcomes? For example, how is protein consumption related to serotonin levels in the brain? To what extent does this lead to a state of hyperalgesia, which decreases in response to morphine?

To what extent is substance abuse in varied socio-economic populations related to dietary differences, nutritional needs, and behavioral outcomes? Are the individual differences in hyperactive or lethargic states that are associated with low-protein diets and resulting niacine and tryptophane deficiencies reflections of genotypic or environmental variables of the interactions between them? Can a single dependent variable be isolated and measured, or are nature/nurture interactions inseparable?

Part 2    Conditioning, Learning, and Behavioral  
          Bases of Habitual Substance Use

Disciplines

Psychiatry, psychology, psychopharmacology

Problem Areas

Mechanisms of addiction, tolerance, habit maintenance, extinction, generalization

Major Research Questions

*Motivation*

Numerous theories postulate the presence of homeostatic mechanisms in the body that respond to external stimuli (including foods and drugs) and produce counter-mechanisms in the central nervous system. A recent variant of this general theory is the opponent-process theory. The opponent-process theory describes a motivational process in which an initial arousal or response to stimuli is followed by an opposite or opponent process. Occurring as an automatic response of the central nervous system to initial arousal, the function of the opponent process is to reestablish the organism's equilibrium. Strengthening or weakening of the opponent process depends on both the intensity and frequency of the arousal stimuli. The opponent-process theory has been suggested as a model for understanding numerous behavioral states, including addiction.

What implications arise from the opponent-process theory that apply to controlled drug-use and eating behaviors?

What circumstances influence weakening of the opponent process, thus leading to the potential termination of aversive substance use behaviors?

In what ways can initiation, experience, and withdrawal processes be better understood by applying this theory as a focal point for motivational research in habitual substance use behaviors?

(Part 2 continued)

Is the theory limited in not going beyond intra-personal variables? How can motivation be fully understood without including interbehavioral consequences of substance use? What intrapersonal and interbehavioral variables influence self-administration of foods and drugs?

What characterizes strength or efficacy of external stimulus events?

#### *Conditioning and Reinforcement*

To what extent do environmental stimuli that are associated with use of a substance lead to compensatory or anticipatory response?

Under what circumstances can tolerance to opiates and other substances be considered a learned response? To what extent can tolerance be reduced by combining a placebo and environmental cues previously associated with drugs or foods?

What is the nature of the relationships between conditionability and heritability?

In what ways can environmental stimuli be examined to predict patterns of substance use?

Most investigators of conditioned learning believe that anticipatory responses are learned responses, in turn leading to compensatory responses that attenuate effects of substance use.

If tolerance to a particular substance is a form of learning, what is the effect of partial versus continuous reinforcement?

How definitive can one be in describing environmental stimuli that maintain tolerance? How does this position correspond to tolerance as dealt with in research on brain neurotransmission?

Given that each drug or food has its unique set of pharmacological or nutritional effects, how important are temporal features of conditioning and environmental stimuli in producing these effects? Is this a synergistic action?

To what extent can abuse and addiction be explained through reinforcing properties of the substance, such as euphoria or "high," stress relief, elevation of arousal state, or change per se, regardless of the direction of change?

*(Part 2 continued)*

When specific commodities are scarce, the question of substitute reinforcements arises.

To what extent are reinforcing efficacies biologically or socially determined?

What nutritional and pharmacological factors determine individual susceptibility or predisposition to specific substance-seeking behaviors?

Set point is a concept related to homeostasis and describes that point at which a change in the body system triggers other elements in the system to oppose or minimize the extent of initial change.

In what ways do set points influence initiation, response, or withdrawal in use patterns? How can intervention mechanisms for planned behavioral change maintain the integrity of personal choice behaviors?

What are the linkages between environmental deprivation, stimulus deprivation, and reinforcement in substance use? In what ways do people in deprived social environments develop stimulus hunger patterns that differ from those of people in other environments? How can findings from animal model research on stimulus deprivation and schedule-induced behaviors be applied to studies in human population groups?

In what directions are habitual substance use behaviors influenced by "hustling," i.e., the activities involved in the initiation and maintenance of a habit? What internal and external stimuli reinforce hustling? Do the actions themselves reinforce habituation rather than the properties unique to the substance and setting of use? To what extent does ease of access to specific foods and drugs, and not hustling, influence conditioning and reinforcement? What role does personality play in conditioned reinforcement?

What implications may be drawn from research on conditioned tolerance, withdrawal, and satiety? To what extent can the connection between large-scale features in society and the typical experiences of an individual participant in that society serve as a bridge to research in learning, conditioning, and reinforcement?

*(Part 2 continued)*

*Personality Differences*

What risk-taking behaviors are characteristic among users of specific substances? What commonalities in risk-taking behaviors apply across drug-use and eating behaviors?

In what ways is it possible to characterize an exclusively drug-using personality type? Given the difficulties in defining an obese personality type, what commonalities nevertheless exist among obese persons?

Is it possible to characterize a generalized addictive personality type?

What role does personality have in substance-seeking and response-evoking behaviors? Do certain personality types opt for experiments in substitution, multiple use behaviors, or controlled use behaviors?

In what ways do personality variables affect the social environment as the critical element in operant conditioning and reinforcement?

Part 3 Sociocultural and Situational Aspects  
of Habitual Substance Use

Disciplines

Anthropology, behavioral pharmacology, economics, epidemiology, ethics, law, sociology

Problem Areas

Values, social institutions, norms; age, sex, ethnic, and class differences in habituation patterns; labeling of users, age of acquisition of usage patterns, controlled and addictive use of substances, changes in use patterns, influence of social setting on consumptive patterns and response

Major Research Questions

*Cultural Values and Ethics*

To what extent do cultural values and derived social norms dictate how much of a substance is enough or too much to consume? In what way does the "right" amount vary with the sex, age, social role, or status of the user? How does social approval or disapproval influence substance use in terms of amount or manner of substance use?

Since cultural controls vary over time, how do legal and other formal social systems respond to this continual process of change?

In what ways can knowledge of the influence of cultural, religious, and moral values be applied to the occurrence of substance use behaviors?

To what extent can there be agreement in scientific and policy fields on when and how substance use becomes labeled as harmful, abusive, addictive, or compulsive?

How is the potential for practicing controlled substance use affected by questions of equity, freedom, and human rights? To what extent do individuals have the right to select their choice of substances and methods of consumption? Or must choice be socially controlled? How can an appropriate balance be maintained between individual choice and socially determined choice?



(Part 3 continued)

*Situational Variables*

To what extent do the set and setting of use influence physiological and psychological response to substances? What are the characteristics of substance use settings that produce positive versus negative responses?

To what extent does diffusion influence use--do each person's practices increase the probability of everyone else's practices?

What commonalities in environmental stimuli influence age or life stage at initiation to habitual substance use?

What groups are associated with abstinence, controlled use, or multiple substance use?

On what basis does society differentially apply labels to define a substance abuser? What values are reflected in labeling group use on the basis of sex, age, life-style, income level, or other user characteristics?

To what extent can groups of people engaged in specific substance use behaviors be defined in ways that help to prevent, treat, or rehabilitate harmful patterns?

Part 4 Prevention, Treatment, and Public  
Policies of Habitual Substance Use

Disciplines

Anthropology, clinical psychology, economics, general medicine, political science, psychiatry, public health, sociology

Problem Areas

Indicators of use, etiology, diagnosis, prevention, treatment, recidivism

Major Research Questions

*Indicators of Substance Use*

What problems are associated with developing accurate indicators, or measures, of substance use? What recommendations could be generated for review and analysis of the scope, range, and character of current indicators? How can indicators be developed to provide accurate characteristics of substance use populations, their use experiences, treatment methods, and outcomes?

Reporting methods and outcome measures of regulatory policies differ among and within societies, and outcome data can be shaped by political influence. Given this situation, what criteria can be used to evaluate the success of diverse policies for controlling substance use? How can uniformity, comparability, and accuracy of substance use information be ensured within the United States and cross-nationally?

*Preventive Controls*

What strategies have been used to reduce the availability and consumption of substances labeled as harmful or addictive? How do prohibition, taxation, physicians' prescribing habits, and health education strategies, for example, influence preventive controls on patterns and amounts of consumption?

*(Part 4 continued)*

What regulatory policies differentially affect members of different age, race, or income groups? How do regulatory policies influence multiple substance use or substitution?

What are the existing and potential roles of industries involved in producing, distributing, or promoting the public's use of substances that may be harmful when used in excess?

How can policies for regulating substance use in contemporary American society be shaped to reflect cross-national experiences?

It has been suggested that in some cultural groups, spontaneous cessation of substance use occurs without any apparent intervention.

What interactive mechanisms produce this effect? What are the cross-cultural applications of such phenomena? How can cross-cultural data on social systems influencing substance use be applied to development of preventive strategies within the United States?

If individuals could prevent themselves from becoming physiologically, psychologically, or socially dependent on a substance, what would the characteristics be of those who choose to do so? Is the appropriate question: how can individuals learn to control substance-consuming patterns as part of initiation to use?

How are the answers to such questions weighted by public policy, social attitudes, intrinsic qualities of the substance, individual differences in motivation, and performance?

What ethical issues are involved in the conduct of self-help health groups? What requirements should exist for the disclosure of results by self-help groups? Who should be responsible for regulating such groups?

#### *Treatment Issues*

What physiological, psychosocial, and other environmental theories are applied to programs attempting to alter or terminate excessive habitual behaviors? How do such theories become operational in program goals, activities, and evaluation?

*(Part 4 continued)*

What theories and practical applications are most powerful in successfully altering habitual substance use? What comparability exists in the approach toward this goal for all substance abuse activities and for all population groups?

What untried theoretical approaches are available for modeling new programs? To what extent are they applicable to controlling all substance abuse activities? Do these questions equally apply to professional programs and those under non-medical auspices, such as Weight Watchers and SmokEnders?

In what ways does delayed reinforcement influence the potential of health-related behavior change? Why is it that long-term rewards diminish individual potential both to relinquish old and to integrate new behaviors into habitual patterns?

Is there more ease in initiating or terminating one substance use behavior than another? To what extent are patterns of substitution and multiple substance use associated with differences in individuals, groups, and substances? In what ways do substitution and multiple use influence recidivism?

Behavioral medicine programs demonstrate that increased success in terminating excessive consumptive behaviors results when family members and significant others are included in therapeutic plans. To what extent are remedial actions applicable to preventive programs? To what extent, if any, have they been applied, and to what extent has there been success in producing controlled substance use?

What is the most appropriate role for professionals in fostering individual initiatives in terminating harmful habits?

In what ways should joint health and law enforcement efforts be undertaken?

Is substitution of one form of substance use for another, more harmful one a decision to be made by informed laypersons (as self-care advocates claim), or are more stringent controls by society necessary to reduce harmful substance use? Who defines "harm"?

## CONCLUSION

The recommended research agenda derives from the Committee's conclusion that a study of commonalities in the use of foods and drugs is a powerful approach for developing further theoretical and applied knowledge of the processes of habitual substance use. This research focuses on internal and external controls of habitual substance use; it deals with both individual decisions and with the effects of group influence and public policies on substance use.

The Committee believes that its recommended research agenda, if implemented, will yield the theoretical foundations for more effective strategies in preventing the adverse consequences of substance use and habitual behavior.



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In addition to the papers and discussions at the Conference on Commonalities in Substance Abuse and Habitual Behavior (see Appendix B), which were basic to the preparation of this report, the works listed here were extremely helpful to the Committee.

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## APPENDIX A



CONFEREES

CONFERENCE ON COMMONALITIES  
IN SUBSTANCE ABUSE AND HABITUAL BEHAVIOR

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**APPENDIX B**





AGENDA

CONFERENCE ON COMMONALITIES IN  
SUBSTANCE ABUSE AND HABITUAL BEHAVIOR

March 25-27, 1977  
Airlie House Conference Center  
Warrenton, Virginia

Welcome/Orientation  
John Kaplan, Conference Chairperson

SESSION I: From Opiates to Appetite

<u>Presenter</u>	<u>Discussion Paper</u>	<u>Discussant</u>
Candace Pert	"Opiate Receptor: Demonstration in Nervous Tissue" (with S.H. Snyder) <i>Science</i> 179, 1973	David Mayer
John D. Fernstrom	"Effects of the Diet on Brain Neurotransmitters" (with R.J. Wurtman) <i>Nutrition Reviews</i> 32(7) July 1974	Alfred E. Harper
David A. Booth	"Satiety and Appetite are Conditioned Reactions" <i>Psychosomatic Medicine</i> 39:76-81, 1977	John L. Falk

## SESSION II: Pharmacological and Environmental Interactions

- Shepard Siegel "Evidence from Rats That Morphine Is a Learned Response"  
*Journal of Comparative and Physiological Psychology*  
89(5), 1975 John L. Falk
- Nancy K. Mello "Theoretical Review: A Review of Methods to Induce Alcohol Addiction in Animals"  
*Pharmacology Biochemistry and Behavior* 1, 1973 Joseph V. Brady
- Wolfgang Schmidt "Prevention of Alcoholism: Epidemiological Studies of the Effect of Government Control Measures" (with R.E. Popham and J. de Lint)  
In J.A. Ewing and B.A. Rouse, eds.,  
*Drinking*, Chicago: Nelson Hall, 1975 Andrew T. Weil

## SESSION III: Set and Setting

- Robert S. Weppner "An Anthropological View of the Street Addict's World"  
*Human Organization* 32(2), Summer 1973 Lawson Crowe
- Norman Zinberg "A Study of Social Regulatory Mechanisms in Controlled Illicit Drug Users" (with W.M. Harding and M. Winkeller)  
*Journal of Drug Issues*  
7(2):117-33, 1977 John H. Gagnon
- M.A.H. Russell "Is Nicotine Important in Tobacco Smoking?" (with R. Kumar, E.C. Cooke, and M.H. Lader)  
*Clinical Pharmacology and Therapeutics* 21:520-29, 1977 Stanley Schachter

## SESSION IV: Nature and Nurture

- |                      |  |                   |
|----------------------|--|-------------------|
| Horacio Fabrega, Jr. | "The Need for an Ethno-medical Science"<br><i>Science</i> 189, 1975  | G. Terence Wilson |
| Gilbert S. Omenn     | "Pharmacogenetics: Clinical and Experimental Studies in Man" (with A.G. Motulsky)<br>In B.E. Eletttheriou, ed.,<br><i>Psychopharmacogenetics</i> ,<br>New York & London:<br>Plenum Press, 1975 | Bert La Du        |
| Donald Goodwin       | "Drinking problems in adopted and nonadopted sons of alcoholics" (with F. Schulsinger, N. Møller, L. Hermansen, G. Winokur, and S.B. Guze)<br><i>Archives of General Psychiatry</i> 31, 1974   | Marc A. Schuckit  |

## SESSION V: Personality and Conditioning

- |                    |   |                 |
|--------------------|---|-----------------|
| Abraham Wikler     | "Dynamics of Drug Dependence: Implications of a Conditioning Theory for Research and Treatment"<br><i>Archives of General Psychiatry</i> 28, May 1973                                     | Charles O'Brien |
| Caroline B. Thomas | "The Relationship of Smoking and Habits of Nervous Tension"<br>In Wm. L. Dunn, Jr., ed.,<br><i>Smoking Behavior: Motives and Incentives</i> , Washington, D.C.: V.H. Winston & Sons, 1973 | Troy Duster     |

## Wrap-Up

Richard L. Solomon, Committee Chairperson  
John Kaplan, Conference Chairperson

