The Ethanol-Induced Loss of Control Concept in Alcoholism

Thomas Kay Williams
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THE ETHANOL-INDUCED
LOSS OF CONTROL CONCEPT
IN ALCOHOLISM

by

Thomas Kay Williams

A Dissertation
Submitted to the
Faculty of the School of Graduate
Studies in partial fulfillment
of the
Degree of Doctor of Education

Western Michigan University
Kalamazoo, Michigan
August 1970
ACKNOWLEDGMENTS

The successful completion of this research was accomplished because others shared their time and interest. The author expresses sincere and grateful appreciation to:

Dr. Kenneth B. Engle, major advisor and committee chairman, whose interest, commitment, counsel, and encouragement added meaning and quality to the entire study,

Drs. Robert L. Betz and Richard Schmidt, dissertation review committee members, for their encouragement and constructive suggestions,

Drs. Louis Govatos and Malcolm Robertson for their help as members of the doctoral advisory committee,

the physicians, Drs. J. D. Henriksen, James R. Jeffrey, and Russell T. Smith, and nurses Lois Lantz, R.N., Mary Bousser, L.P.N., and Pat Bowers, L.P.N., for their willing and cooperative assistance,

Nancy Reynolds, for invaluable assistance in every way from the beginning to completion, Janet Detweiler for typing assistance, and Jeanne Bournazos for typing the final manuscript,

Battle Creek Sanitarium administrative personnel, Richard Lane and Avon Kierstead, for their support,

the 40 unnamed people who were willing to serve as subjects in this study,

Teri, Tommy and Tonyce, who encouraged Dad to "get it finished,

and my wife, Audrey, who patiently endured absences, preoccupations, frustrations, and temporary personality fluctuations, yet shared encouragement and hope for the successful accomplishment of this project.

Thomas Kay Williams
WILLIAMS, Thomas Kay, 1930-
THE ETHANOL-INDUCED LOSS OF CONTROL CONCEPT IN ALCOHOLISM.

Western Michigan University, Ed.D., 1970
Health Sciences, general

University Microfilms, A XEROX Company, Ann Arbor, Michigan
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CHAPTER I

THE PROBLEM

Introduction

Alcoholism is widely recognized as the number four public health problem in the United States. Many authorities and organizations, including the American Medical Association, define alcoholism as a disease (A.M.A., 1967; Block, 1965; Jellinek, 1960).

There are, however, many unanswered questions related to the disease concept of alcoholism. The present study addresses itself to the one-drink loss of control concept which is one theory explaining the alcoholic's compulsive consumption of alcohol.

The Purpose

The ethanol-induced loss of control concept in alcoholism is widely believed by alcoholics and others, yet it is a phenomenon about which there is little understanding and much confusion. The primary purpose of this study was to learn if one drink of ethanol ingested by the alcoholic either psychologically or physiologically, neither psychologically nor physiologically, or both psychologically and physiologically induces increased desire for ethanol intake.

The Statement of the Problem

Many alcoholics who are attempting recovery from alcoholism believe that the ingestion of as little as one drink of alcohol will
set off a strong or uncontrollable urge for further alcohol consumption. Frequently alcoholics, who are committed to the attainment of sobriety, will refer to the importance of avoiding that "first drink."

Typical of the divergent beliefs regarding the loss of control concept is that of Van Dorn (1968), who holds that where and what an alcoholic drinks is of little importance, and that the presence of alcohol in the alcoholic's body is all that matters. Voldeng (1962), a physician who specializes in alcoholism, acknowledges that though the causes are obscured, the alcoholic has reached a state of illness characterized by his inability to consume alcohol in any form. He cautions against even one drink with the warning that it will send the alcoholic after another, day after day until he is no longer conscious. He believes, too, that the alcoholic is beset with an abnormal reaction to alcohol for which the only solution is to avoid the beverage completely and forever.

In referring to the establishment of the diagnosis of alcoholism, Bier (1962) depicts the loss of control phenomenon as one of the identifying symptoms of alcoholism if once he takes his first drink, the individual loses the ability to control subsequent alcohol consumption.

Frequent reference to the ethanol-induced loss of control concept, as commonly held by the members of the Alcoholics Anonymous Fellowship, is made by Clinebell (1956) who indicates that some irreversible change in biochemistry may give the alcoholic a sensitivity or allergy to alcohol so that one drink sets off a chain
reaction leading inevitably to a drunk. In elaborating further on the A.A. method, Clinebell points out that the A.A. members believe their bodies do not react to alcohol in the same manner as the body of the normal drinker because of an alleged physical allergy to alcohol. The first drink is given as the reason for setting them off on a binge.

Alcoholics Anonymous literature refers frequently to the "first drink" and its inevitable devastating effect upon the alcoholic. An A.A. doctor (A.A. Grapevine, October, 1968) reports that the power of alcohol, including a single drink, develops an urge within the alcoholic to take more and more alcohol. He indicates that it is not yet known precisely why the alcoholic becomes powerless over alcohol or why it is that he must avoid the first drink.

Though he does not identify a specific amount, Blane (1968) refers to the alcoholic's loss of control over his drinking once he has started.

Dorris and Lindley (1968) claim that when an alcoholic consumes any small quantity of alcohol an overwhelming psycho-physical demand for more alcohol will manifest itself, and the drinker will continue to drink until he passes out or becomes physically ill.

In spite of the widespread prevalence of the theory that one drink sets off a strong or uncontrollable urge to consume more alcohol, there are others who hold that this concept has no basis in fact. Among them is Cain (1964), who believes that the alcoholic probably does not take his disastrous first drink until he has reconciled himself to a binge, thus implying a psychological rather than a
physiological basis for the alcoholic's strong or uncontrollable urge for more alcohol.

Block (1965) holds that drinking is compulsive with many alcoholics, but that there is little in the way of allergic manifestation to characterize it as an allergy. Concurring with Block are Bier (1962) and Jellinek (1960), who dismiss the idea that alcoholism is on a hyper-sensitivity or allergic basis.

To further confuse the issue, it is held by others (Mann, 1958; and Stewart, 1960), that there are occasions now and then when an alcoholic may be able to drink along with friends and show no adverse effects such as loss of control and excessive drinking.

A further dimension is added by Valles (1967), whose experience with alcoholics has convinced him the alcoholic loses his control and power of volition not when he has had his first drink, but before taking it.

The diversity of belief regarding the effect of one drink of ethanol upon the alcoholic's ability to refrain from further ingestion of alcohol makes evident the need for a carefully controlled study of the problem. In addition, deciding this critical issue may point to new directions in treatment.

The specific and primary problem approached in this study had to do with the influence of one drink of ethanol upon the alcoholic's desire for further alcohol intake. The study was designed to indicate the presence or absence of a physiological effect upon the alcoholic's desire to drink as well as the presence or absence of a psychological effect. The design of the study permitted the measurement of these factors interrelatedly as well as separately.
Variables in this study included the independent variables which were one ounce of 100 proof vodka as an accepted equivalent of the "one drink" or "first drink" referred to in the ethanol-induced loss of control concept and information given to the subjects. The independent variables were controlled and manipulated in order to measure their effect upon the dependent variable.

The dependent variable was the subject's desire or urge for a drink of alcohol measured by his response on a questionnaire scaled from no desire to an almost uncontrollable urge.

Significance of the Study for Education

The primary significance of this study for education lies in the area of therapy, research, and general knowledge. As noted in the statement of the problem and in Chapter II, it is evident that there is much confusion regarding this issue. While there is no lack of opinion, and much variation in those opinions, there is very little research dealing with the problem as stated. Although the convictions of many of those holding specific views regarding this problem are firm, there is an apparent lack of evidence to demonstrate the proof of those convictions or support them empirically.

As indicated in Chapter II, some rather complex and impressive theories have been built upon opinions regarding the alcoholic's response to a very small amount of alcohol in his system, and yet the validity of some of these theories has not been empirically demonstrated.

The findings of this study may be helpful in giving direction
to further research studies. If, for example, it is found that there is a psychological but not a physiological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake, it would hold strong implications for therapy in alcoholism. The same, of course, would hold true if the reverse situation were found (a physiological or a physiological and psychological relationship). The results are discussed in detail in Chapter V.

The many experts and authorities in alcoholism cannot all be correct in their views since there is such a broad spread of divergent views regarding this problem. This study may be helpful in identifying and supporting the actual factors involved in the phenomenon under consideration. Likewise it should be helpful in identifying the presence and nature of factors which appear to be more mythical than factual.

Definition of Terms

To aid in an understanding of the terms used in this thesis, the following definitions will apply.

A. A.: An abbreviation for Alcoholics Anonymous, an organization of alcoholics engaged in self-help efforts to recover from alcoholism.

Alcoholism: The PHS publication number 1640 identifies alcoholism as a chronic disease or disorder of behavior, characterized by the repeated drinking of alcoholic beverages to an extent that exceeds customary dietary use or ordinary compliance with the social drinking customs of the community and which interfere with the drinker's...
health, interpersonal relations, or economic functioning. Dr. Ebbe Curtis Hoff of the Medical College of Virginia refers to three identifying facets in alcoholism. 1) There is loss of control of alcohol intake—the victim finds himself drinking when he intends not to drink or drinking more than he had planned. 2) There is functional or structural damage: physiological, psychological, domestic, economic, or social. 3) Alcohol is used as a kind of universal therapy, as a psychopharmacological substance through which the problem drinker attempts to keep his life from disintegrating (P.H.S., 1967).

Alcoholic: For the purposes of this study, an alcoholic is one whose life gives evidence of the symptoms of alcoholism to the extent that he requires hospitalization and treatment for the problem. It should be stressed that frequently the symptoms of alcoholism are evident to members of the family, friends or others associated with the alcoholic, yet may be denied by the alcoholic. Denial of the problem, which is frequently referred to as one of the symptoms of alcoholism, will not constitute sufficient reason for excluding an alcoholic from this study in the presence of sufficient other identifying factors.

Ethanol: Ethanol is a common term frequently used in place of ethyl alcohol. It is one of a group of aliphatic sedatives or soporifics (Bailey, 1965-1968).

Loss of Control: This refers to the subject's inability to control the amount of his ethanol intake.

Physiological: This refers to organically or "in the body" related responses to the independent variables in this study.
Psychological: This refers to psyche or "in the mind" related responses to the independent variables in this study.

General Hypotheses

The general hypotheses investigated in this study were as follows:

\( H_1: \) There is a physiological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

\( H_2: \) There is a psychological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

\( H_3: \) There is both a physiological and psychological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

\( H_4: \) There is a relation between what an alcoholic believes regarding an alcoholic's desire to drink upon the ingestion of one drink of alcohol and the desire he actually experiences when he has had one drink.

\( H_5: \) There is a relation between the alcoholic's self concept and his age.

\( H_6: \) There is a difference between alcoholics who are A.A. oriented and those who are not A.A. oriented in their belief regarding the ethanol-induced loss of control concept in alcoholism.

These hypotheses are restated in the testable null form in Chapter IV, page 514.
CHAPTER II

REVIEW OF THE LITERATURE

A review of selected, related literature on alcoholism, written by both professional and lay people, gives evidence of many different opinions and theories related to the loss of control phenomenon in alcoholism. In an attempt to present an orderly picture of the various aspects of this problem, Chapter II is organized in the following manner:

I Types of Alcoholism
II Loss of Control Defined
III Loss of Control and the First Drink
IV Loss of Control Theories
   a) Physiological theories
   b) Psychological theories
V Research Related to the Loss of Control Phenomenon
VI Summary

Types of Alcoholism

In his book, The Disease Concept of Alcoholism, which has become a near classic in alcoholism literature, Jellinek (1960) identifies several species of alcoholism along with identifying characteristics.

Alpha alcoholism represents a purely psychological continual dependence upon the effect of alcohol to relieve bodily or emotional pain. This type of alcoholism is characterized by undisciplined drinking with no signs of a progressive process, and it does not lead to "loss of control" or "inability to abstain." Problems precipitated by this type of alcoholism include disturbance of interpersonal relations, occasional absenteeism from work, decreased productivity,

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interference with the family budget, and some of the nutritional deficiency complications of alcoholism.

It is quite possible that alpha alcoholism may develop into gamma alcoholism.

Beta alcoholism is the species of alcoholism in which medical complications such as gastritis and cirrhosis of the liver may occur without either physical or psychological dependence upon alcohol. The heavy drinking may cause financial problems, lowered productivity, and a curtailed life span, however, pronounced withdrawal symptoms are not present. Beta alcoholism may also be a developmental stage of gamma or delta alcoholism but it is less likely than with alpha alcoholism.

Gamma alcoholism is that species of alcoholism characterized by acquired increased tissue tolerance to alcohol, adaptive cell metabolism, withdrawal symptoms, and "craving" i.e. physical dependence, and loss of control. Gamma alcoholism is characterized by a definite progression from psychological to physical dependence and, in addition, may include some or all of the problems identified with alpha and beta species.

Gamma alcoholism produces the greatest, most serious and most prominent kinds of damage.

Delta alcoholism shows all the characteristics of gamma alcoholism with one very pronounced difference. Instead of loss of control, there is an inability to abstain from use of alcohol. The delta alcoholic is unable to avoid ingesting alcohol for even a day or two without manifestation of withdrawal symptoms. He does, however,
retain the ability to control the amount of alcohol intake on any
given occasion.

Jellinek refers to several other species of alcoholism including
epsilon alcoholism, which is the least known species, and concludes
that the gamma and delta species may come into consideration as
diseases since they include the adaptation of cell metabolism,
aquired increased tissue tolerance, withdrawal symptoms, and loss
of control or inability to abstain.

Gamma alcoholism is acknowledged as apparently, but not with
certainty, the predominating species of alcoholism in the United
States and Canada as well as in other Anglo-Saxon countries. Members
of Alcoholics Anonymous recognize gamma alcoholism to the exclusion
of all other species since they use loss of control and craving as
the criteria.

It is believed by Jellinek (1960) that at least ten per cent to
fifteen per cent of the membership of Alcoholics Anonymous are probably
specimens of alpha alcoholism. He points out that the Alcoholics
Anonymous Fellowship philosophy holds a special appeal for the gamma
type alcoholic. Others, including King (1953), Buss (1966), McCormick
(1969), and Collins (1966) refer to the various species of alcoholism
with emphasis upon gamma alcoholism. Much of the literature on the
subject of alcoholism refers to the characteristics of the gamma type
species of alcoholism without identifying it by the species name.

Alcoholism treatment programs in the United States with struc-
tured therapeutic efforts in behalf of the alcoholic are involved
primarily with gamma type alcoholism. It is believed that the loss
of control experience of the gamma alcoholic is in most cases the primary factor in motivating the alcoholic to seek treatment. This factor helps explain the very high rate of gamma alcoholics involved in treatment as compared with the other types who, while they may receive medical care for related problems, seldom seek aid for their drinking problem.

Loss of Control Defined

Loss of control in common parlance, and for purposes of this study, refers to an alcoholic's inability to control the amount of alcohol intake once he has ingested alcohol. It is further understood as the alcoholic's deprivation of free choice with regard to alcohol intake once he has ingested alcohol. An alcoholic experiencing loss of control can retain the ability to go for several days, weeks, months or even years without drinking alcoholic beverages but, according to the definition, upon his ingestion of alcohol, he sacrifices the ability to control any further intake.

Loss of control has been designated by Stewart (1956) as the loss of freedom which follows the first ingestion of alcohol in a new bout, and it is referred to by Vogel (1953) as a "compulsion with insatiability" (pp. 100-101).

According to Jellinek (1960), loss of control is characterized by minor withdrawal symptoms in the presence of alcohol in the bloodstream, and the failure of the alcoholic to achieve the desired euphoria for more than a few minutes. These symptoms, according to Jellinek, explain superficially the behavior observed in loss of
control. He hypothesizes that the symptoms suggest a combination of short-range accommodation of nervous tissue with long-range acquired increased tolerance.

Loss of control takes place, according to Buss (1966) when once an individual takes the first drink, he continues to imbibe until he is too sick or too uncoordinated to take any more.

Referring to the loss of control phenomenon, Pittman and Snyder (1962) hold that whenever an alcoholic starts to drink it is not certain that he will be able to stop at will. They believe that loss of control means that any drinking of alcohol starts a chain reaction which is felt by the drinker as a physical demand for alcohol. The bout may not even be started by any individual need of the moment but by a "social drink."

The loss of ability to exercise control over one's drinking is cited by Kinsey (1966) as the basic factor differentiating the alcoholic from other drinkers.

Stine and Smart (1965) state that loss of control is a central feature in the definition of alcoholism according to most workers, and Jellinek (1960) makes it the defining feature of the form of alcoholism most common in North America. They state that loss of control presumably means that after a critical quantity of alcohol has been taken in, inhibitions on further drinking are gone, including resolutions reached during treatment. When the point of loss of control is reached in the development of alcoholism, one drink or some unspecified but small number of drinks sets the alcoholic off on a binge.
Loss of Control and the "First Drink"

The "first drink" is frequently identified as the "culprit" responsible for setting off the loss of control phenomenon in alcoholics.

Among those who believe and propagate this theory are those who are active in or acquainted with the Alcoholics Anonymous (A. A.) philosophy. The writings of Alcoholics Anonymous members, as well as official publications of the organization, in referring to the one-drink loss of control concept almost invariably hold it to be a valid theory. In writings which could be identified as based in Alcoholics Anonymous philosophy, this investigator could find no references to the loss of control phenomenon which did not concur with the "one-drink" concept.

Among members of the Alcoholics Anonymous Fellowship writing on alcoholism is Doe (1955), who believes that an alcoholic is one who having taken one drink, cannot absolutely guarantee his behavior. Referring to an Alcoholics Anonymous saying, "One drink is too many; a thousand aren't enough (p. 81)." Ullman (1960) states that loss of control is the chief characteristic of the alcoholic's drinking, and the first task which pervades all programs of treatment is to keep the alcoholic from taking the first drink. He concurs with Riley (1950), who holds that once alcohol is in an alcoholic it creates a demand for more alcohol, and Sherman (1950), who believes that an alcoholic is always only one drink away from a drunk, and the only way to arrest alcoholism is to never again take the first drink.
Sherman holds that an alcoholic is temporarily insane when he has had his first drink and after that first drink the alcoholic is unaccountable. His desire for more liquor is so overpowering that nothing else matters, and no matter how long the alcoholic lives, he cannot let himself take that first drink.

"Don't take that first drink; one is too many and a thousand not enough (p. 166)," is cited by Patterson (1966) as the A. A. club's rule of thumb. O'Brien (1965) points out that after only one drink the alcoholic's judgment can be trusted no more.

An alcoholic priest and member of Alcoholics Anonymous, Pfau (1958), believes that an alcoholic would be disturbed if he took enough alcohol to penetrate his blood stream or brain cells. He holds that two teaspoonsful of ordinary Mass wine would not bother the worst alcoholic due to its very low alcohol content. Commercial fortified wine, on the other hand, can cause a definite reaction if taken by an alcoholic, even in the minimal amount of two tablespoonsful. Pfau recalls an experience in taking the fortified wine by mistake during the celebration of the Mass and later learning that the alcohol content was 22%. He began to feel a terrible compulsive craving that overwhelmed him, thinking that if he did not have a drink he would go crazy. He called one of his fellow priests and talked to him on the phone for two solid hours after which the craving for alcohol left him.

Saying that one drink might set the fires of alcoholism raging out of control in an alcoholic's life, Dunn (1965) refers to the experience of a young man who drank "near-beer" which contained
approximately one half of one per cent alcohol. He alleges that the trace of ethyl alcohol in the "near-beer" was enough to start the young man drinking again. Dunn also refers to the experience of a physician, who upon drinking one half glass of beer, lost control which started the physician on a drinking pattern which ended ten years later with the doctor on skid row.

One alcoholic, an anonymous writer (1968), believes that once an alcoholic has taken the first drink there is set up within the body a physical as well as a psychological need for more alcohol. Dismissing will power as a factor, he compares the alcoholic's need for alcohol after taking the first drink, with the diabetic going into a coma after consuming sugar.

The "bible" of Alcoholics Anonymous, often referred to as the "Big Book," is titled Alcoholics Anonymous. In the doctors' opinion section of this book, it is asserted that the alcoholic cannot start drinking without developing the phenomenon of craving.

The A. A. Grapevine (1968) holds that the alcoholic's decision to drink or not to drink has to be made before he takes the first drink. The question is asked by an alcoholic physician, "Why is it that the alcoholic cannot take a single drink without developing an urge to take more and more and more?" (p. 35). It is held that when the alcoholic takes a drink into his body, something immediately happens to him and he has to have more alcohol. The alcoholic steps onto the road to alcoholism with his first drink, and he becomes victimized by a true physiological process.

Members of the Alcoholics Anonymous Fellowship generally hold
that it is not the fifth, or the tenth, or the twentieth drink that makes them drunk, it is the first. The first drink is designated as the one that does the damage; the one which starts the chain reaction leading to uncontrolled drinking.

Other writers, both lay and professional, refer to the first drink and its relation to loss of control in the alcoholic.

Glasscote (1969) holds that only a small minority of alcoholics can resume any kind of drinking after treatment without losing control. A pamphlet entitled "Who is Allergic" (1966), reports that once the progressive drinker has alcohol in his system, the controls in his brain are gradually anesthetized. The article warns of the possibility of the first sips of any alcoholic beverage causing a craving for more alcohol within the alcoholic.

With loss of control Milt (1967) asserts the drinker can no longer maintain his resolution not to drink nor can he curb his drinking once it has begun.

Referring to the crucial behavioral change called loss of control, Bacon (1958) holds that with increasing frequency the taking of the first drink becomes an effective trigger for the achievement of intoxication.

Hypothesizing that even if an alcoholic should become a saint and takes the first drink he will get drunk, Doe (1957) concurs with Williams (1960), who relates the story of an alcoholic who, after six years of not taking one drop of alcohol, decided that one small drink could not possibly do any harm. After taking the first drink, within a fortnight, the alcoholic was drinking two bottles of gin.
of control is identified by Fox et al. (1955) as a pattern of behavior restricted to the addictive drinker in which, once drinking has been started, it will not stop until the individual is so drunk or so sick that he can no longer swallow another drink. The authors maintain that when, for no matter what reason, an alcoholic who has been sober for weeks or even months takes his next drink, his loss of control dictates that he will continue to drink until once again he is physically unable to swallow another drop.

Williams (1951) acknowledges that there is a type of person who, as a result of taking one drink, must take another and another since he has no control over his own actions in the matter.

The alcoholic's loss of control over his drinking after he once begins is identified by Lindley and Dorris (1970) as one factor included in a definition of alcoholism, and Taylor (1953) believes a book could be written on the subject of "that first drink." "If an alcoholic would stay away from it he would never get drunk (p. 8)."

The one-drink loss of control factor is used by Hanners (1966) in distinguishing between the drunkard and an alcoholic. Once the alcoholic starts drinking he can't stop, but the drunkard stops whenever he feels like it. When the alcoholic drinks, all he can think about is where he will get his next drink. Similarly, Free (1955) determines alcoholism with loss of control following the first drink. Drake (1964) assumes that for all practical purposes, one may be considered an alcoholic as soon as the results of taking a drink become unsatisfactory, unpleasant, unpredictable, and usually
lead to a lot more drinking. The probability of the drink-induced or drink-related loss of control in the majority of cases, even after sobriety for six months or six years, is pointed out by Gitlow (1968).

In the same reference, Jellinek holds that loss of control is evident once the alcoholic has started drinking and that without alcohol in the system, loss of control is not present to give rise to the beginning of a new drinking problem.

Questioning the diagnostic criteria that delimit alcoholism, Wallerstein (1957) asks whether it is a function, not of amount, but of degree of control over the drinking, which distinguishes the alcoholic state.

An automatic subconscious tendency or pull toward uncontrolled drinking only after an alcoholic's first drink has been taken, is suggested by McGoldrick (1966). He identifies this as a condition that compels the alcoholic to continue to drink after he has taken his first drink.

According to Kinsey (1966), it is a well accepted fact that most "recovered" alcoholics cannot take their first drink without losing control, regardless of how long they have been able to maintain sobriety prior to taking the drink.

The comparison of the compulsion leading to loss of control in the alcoholic after he has ingested alcohol, with the craving of a drug addict whose body cries out for a "fix" is made by Collins (1966). He believes the craving is beyond will and overrides and ignores all feelings of the moment except the crying out of every
pore of the alcoholic's body for alcohol.

Theories on the Loss of Control Phenomenon

Among recovered alcoholics and professional personnel involved in the study or treatment of alcoholism, there are several theories regarding the etiological and related factors in the loss of control phenomenon. There are also recovered alcoholics and other professionals who have divergent views regarding the etiology of the loss of control phenomenon. Most of the theories having to do with the loss of control concept are related to two primary areas: One, the loss of control phenomenon does exist and it is the result of primarily physiological factors; two, the loss of control phenomenon does exist but results primarily from psychological factors. As an aid in further understanding the specific problem under investigation, several of the major theories will be considered under the broad headings of physiological and psychological theories.

Physiological Theories

Among the theories which attribute the loss of control phenomenon to primarily physiological factors is the allergy theory which is propounded by Alcoholics Anonymous and others.

The allergy theory is presented in different ways by various groups, including the Annual Report of Eversharpe, Inc. (1966) which stimulated a reprint of an article entitled "Who is Allergic?" The report contends that the alcoholic is allergic to alcohol, based on a genetically transmitted disfunction of metabolism and that this
easily proven fact should be widely disseminated because of the lives it would save among the descendants of progressive drinkers.

Hanners (1966), Riley (1950), Anonymous (1955), and others refer specifically to alcoholism as an obsession of the mind and an allergy of the body. Many lay persons writing on loss of control as well as scientists in various areas, either state directly or infer the presence of a type of allergy as a causative factor in the loss of control phenomenon.

The "Big Book" of A.A., Alcoholics Anonymous (1955), holds that the action of alcohol on chronic alcoholics is a manifestation of an allergy, and that the phenomenon of craving is limited to this class. These allergic types can never safely use alcohol in any form at all. Once started drinking they will develop the phenomenon of craving which may be the manifestation of an allergy which differentiates alcoholics from non-alcoholics.

An alcoholic medical doctor, in an article entitled "Here's Why," acknowledges that medical science has not discovered precisely why it is that the alcoholic becomes powerless over alcohol, or why it is that he must avoid that first drink. The physician refers to a physical element within the alcoholic as the x factor. He believes that the x factor is a very poorly understood trigger mechanism within the alcoholic's body which, when combined with alcohol, leads to alcoholism. He holds that when the alcoholic takes a drink into his body something immediately happens to him because of the presence of the x factor. The alcoholic steps onto the road to alcoholism with this first drink and becomes victimized by a true physiological process.
The author of the Genetotrophic Concept of Alcoholism, Williams (1951), holds that alcoholism stems from both an inborn or hereditary trait and nutritional deficiency. He asserts that, inasmuch as the alcoholic is afflicted with a physiological urge, he can receive effective help only by physiological means. The hereditary trait which predisposes toward the disease alcoholism is identified as the possession of unusually high requirements for certain food elements. Food as ordinarily chosen by the alcoholic is not likely to supply enough of the essential elements especially when alcohol is consumed. The resultant deficiencies set up a craving for alcohol. If the individual with this hereditary trait is able to get all the nutrients he needs, the disease does not appear.

Taylor (1963) compares alcoholics with diabetics in which the disease is never wholly eradicated but remains dormant; ready to spring to life whenever the diabetic becomes careless in the use of his insulin or the alcoholic uses alcohol. Similar comparisons are made by Riley (1956) and Dunn (1955). It is suggested by Habas (1956) that some people have a natural appetite for alcohol and an allergy-like reaction to it because of certain glandular defects that may be inherited.

Physiological addiction to alcohol, according to Hayman (1966), may be accompanied by alterations in the biochemical constituents including the enzymes which dehydrogenize alcohol. He believes the claim that alcoholism is due to an allergic hypersensitivity has neither been substantiated nor has there been adequate evidence to the contrary. He does identify an organic type of craving and cites
Jellinek as suggesting that the craving after the first drink may occur because the metabolism of cells of the nervous tissue has become conditioned or sensitized to the signal of the first drink.

While the allergic hypothesis is popular among laymen and members of A. A. and is widely used by these groups as well as physicians to explain the "abnormal" reactions of certain individuals to alcohol, Haggard (1944) holds that there is really no valid evidence for a true allergy to alcohol. He does concede that, although it may have considerable value as an explanatory hypothesis, so far as is known, the use of no other allergan creates a craving for itself. Discounting the allergy theory as more a popular conception than scientific, Milt (1967) also denounces the genetotrophic theory of Williams as lacking supporting evidence. He cites Alexander's supposition that in advanced cases, a craving for alcohol has a great similarity to the craving in drug addiction in which the physiological adaptation to the drug is well established.

In 1959, Williams departed from the nutritional theory of genetotropic disease in favor of a theory more closely related to the allergy theory. He proposed that there is in the hypothalamus a regulatory center for the control of alcohol consumption (similar to the thalamic control centers for hunger and thirst). In certain susceptible individuals, alcohol throws this control center out of operation (poisons it) destroying the regulatory functions and resulting in an insatiable appetite for alcohol.

An abnormal physical reaction to alcohol was identified by Williams (1960) as the most important of the constitutional factors
in alcoholism. He holds that the intense and insistent craving for alcohol is the direct result of the abnormal physical reaction to the alcohol, but that the victim's inability to deal with it is the consequence of his psychological maladjustment. Williams holds that some alcoholics may experiment with one or two drinks a night for two or three weeks, or even longer before the inevitable compulsion to drink reasserts itself. Although the physical compulsion may appear to be delayed, he believes the mental obsession with alcohol is re-activated almost at once.

A constitutional predisposition either to psychic deviation or to alcohol tolerance, according to Bacon (1958), is often assumed in alcoholism and eventually conditioning or addiction to the pharmacological action of alcohol may be present.

The concept of the alcoholic's hypersensitization to alcohol in which the initial drink sensitizes the body so that future drinks create a different effect on the alcoholic than they do on the majority of other people is referred to by D'Alonzo (1959).

Gitlow (1968) allows for the possibility of a biochemical defect within the brain of the alcoholic which causes him to be truly uncomfortable without the sedating effect of alcohol.

The anonymous author of The Drinking Game and How to Beat It (1968) stresses a physical need for alcohol after the first drink is ingested, and holds that the alcoholic is physically unable to withstand the attack of liquor upon his system.

The parallel between the alcoholic's craving and physiologically determined appetite is discounted as untenable by Wexberg (1950), who
holds that physiological craving lies in the gustatory apparatus. Alcoholics frequently hate the taste of alcohol and drink only in order to experience the effect of alcohol on the nervous system. He points out that Williams has made the mistake of attributing etiological significance to biochemical deviations found in alcoholics after their alcoholism has been established.

According to Williams (1960), many alcoholics hate liquor, hate drinking, hate the taste, hate the results, and hate themselves for succumbing, but having started they cannot stop. Their drinking is as compulsive as the stealing of a kleptomaniac. Lack of control over drinking is identified by Bacon (1968) as a significant characteristic which differentiates alcoholics from others who drink. At this point, Bacon believes the alcoholic is consuming alcohol but not drinking in the ordinarily understood sense of the word.

Among the factors in the etiology of alcoholism, identified by Williams (1951), is the possibility of a deficiency in some particular enzyme which can instill an appetite, or craving for alcohol. He believes that the predisposition to alcoholism is inherited and that it may be a very complicated combination of traits. He holds that the alcoholic continues to drink during a bout to avert the acutely distressing withdrawal symptoms which appear as soon as alcohol becomes inaccessible, and justifies speaking of an irresistible demand for alcohol, irrespective of whether such a craving is physical or psychological. He does note that the demand for alcohol ceases when an appropriate type of sedative other than alcohol is administered. Between drinking bouts, however, the alcoholic does not show any
signs of needing alcohol, and the motivation leading to a new drinking experience cannot be described as craving.

Brain damage from alcohol and indirect effects of alcoholism, such as nutritional deficiencies and head injuries, according to Lemere (1956), can explain to a large extent, the essential pathology of alcoholism which is identified as the permanent loss of control over drinking. He believes that the part of the brain which observes the highest cerebral functions of will power, judgment, and control suffers most from alcoholism and these cells are also the first to be anesthetized by alcohol. He asserts it is logical to assume that with progressive destruction of the frontal cortex less alcohol will be required to produce that stage of anesthesia where control is lost. His explanation for the alcoholic's need for permanent abstinence is based on the fact that once alcohol enters the alcoholic's system, there is an immediate paralysis of the control centers of the brain.

The chemical influence on metabolism is identified by Baldie (1931) as one of the factors in the craving of alcohol by the alcoholic and MacLeod (1950) believes the biochemical approach to the understanding of alcoholism and loss of control to be the most fruitful.

The Psychological Basis

A full page advertisement carried in the New York Times, San Francisco Chronicle, and the Wall Street Journal asserting that alcoholism had been proved conclusively to be purely biochemical in
cause, and a definitive treatment was now available, is referred to by Glasscote (1967). A group of persons from various professions including psychiatrists had endorsed this position in the advertise-
ment. Glasscote asserts that the overwhelming majority working in the field of alcoholism disagree with this point of view and deny that there is any such proof. He states that the eclectics, who seem to be doing the most successful work, see the abuse of alcohol as symptomatic of some other behavioral disturbance that preceded and probably exists concurrently with the alcoholism. They do not view the alcoholic as biologically different from non-alcoholics except that damage such as malnutrition may have resulted from excessive alcohol consumption.

A psychologically oriented school, according to Bacon (1958), considers alcoholism to be a manifestation of a neurosis based on deficient or arrested development of personality rooted in childhood. Environmental factors favoring recourse to intoxication as a defense against unconscious stresses connected with personal and life re-
sponsibilities are thought to explain why the illness takes the form of alcoholism rather than some other neurosis.

In defining alcohol addiction, Keller and Seeley (1958) refer to an overwhelming desire, need, impulse, or compulsion to drink and to obtain alcoholic beverages by any means, with psychological and possible physiological dependence on alcohol marked by a tendency to be unable to stop when drinking has begun. Gitlow (1968) once felt that the reasons for a compulsion to drink were psychological and continues to offer this as one of two possible explanations. One
reason is that alcoholism is a compulsive psychiatric syndrome of such a nature that the alcoholic's psyche is going to force him at knife point to drink throughout his life. His other explanation is the possibility of a biochemical basis, referred to earlier.

Alcoholism is regarded by Wallerstein and his associates (1957) as symptomatic of a deep seated emotional difficulty. The anonymous author (1968) of The Drinking Game and How to Beat It refers to the misnamed physical craving for liquor as merely a psychological need to postpone facing reality.

The alcoholic, McGoldrick (1966) states, is not suffering from a disease, but is ill at ease and his excessive drinking has a mental, emotional cause. He believes it is evidence of psychological stress from deep in the subconscious causing distress in the conscious from which the alcoholic attempts to escape by drinking. Loss of control is built upon a set conscious habit pattern that immediately takes over and is not content with one or two drinks. He states that the alcoholic has no physical craving, but what he mistakes for a physical craving after the first drink is a psychological urge to continue to drink resulting from his conditioning. This physical craving following the first drink is identified as a psychological condition of compulsive spree drinking which arises only after one becomes an alcoholic. It is not a condition that compels the alcoholic to drink, but it is a condition that compels the alcoholic to continue to drink after he has taken the first drink. As soon as the alcoholic has taken the first drink, it is a go ahead signal to the subconscious mind which, from long habit, immediately
installs a "psychic bartender" who then is "ruler" and "governor" of the drinking conduct.

The old axiom "once an alcoholic, always an alcoholic" (p. 13), is described by Hazelhurst in the forward to Cain's book (1967). He states that it serves nothing but hopelessness and that "it is as ridiculous as saying, once a hater, always a hater" (p. 13). He believes it implies people are unable to change themselves from within to renew their attitudes from their personalities, and that for many it should be possible to state "once an alcoholic; and now a man" (p. 13).

Alcoholism, according to Cain (1967), is not a disease, and the former alcoholic can completely recover. Cain believes if he works hard enough, the alcoholic can become a normal drinker, thus implying that loss of control in an alcoholic is a psychologically induced reversible phenomenon.

The influence of psychological factors upon the alcoholic who returns to the use of alcohol in the face of repeated difficulty with it is implied by Williams (1969). He also makes allowance for the additional psychological and physiological effects of the drug once it is in the body of the alcoholic. This theory is similar to the concept of Lindley and Dorris (1970), who believe that psychological factors are responsible for the first drink which ends the dry spell, followed by the physiological factors which are triggered by this drink. According to Jellinek (1955), a clear distinction should be drawn between the mechanism which leads from the completion of one drinking bout to the start of another one, versus continuation of
drinking within a bout. The alcoholic steps onto the road to alcoholism with his first drink, and because of the presence of the factor, he becomes victimized by a true physiological process.

Although the need to drink excessively involves varied pathogenic mechanisms, and that physio-pathological modifications may play a part especially in the later stages, Duchene (1955) believes that psycho-pathology predominates.

The urgent and overpowering desire to drink alcoholic beverages, according to Mardones (1955), is based primarily in psychological causes aiming at avoidance of unpleasant feelings. He allows for a physiological influence as the alcoholic tends to obtain energy or alleviate withdrawal symptoms.

Concurring with Mardones is MacLeod (1955), who cites Williams, Sirnes, Lester and Greenberg, Masserman, and others in support.

Conclusions of the World Health Organization Expert Committees on Mental Health and Alcohol (1955) included the suggestion that physical dependence on alcohol be used to describe the processes operative immediately after withdrawal of alcohol after prolonged, continuous, excessive drinking. It was recommended that pathologic desire for alcohol be used to describe drinking to relieve psychological tension which has built up during the period of abstinence, and in this condition the individual may be said to have been psychologically dependent on alcohol. Resumption of drinking can be caused by social pressure to drink, accidental ingestion or a physio-pathological condition other than physical dependence.

Tension caused by guilt in the alcoholic leads to changes in
the physiology of the brain which leads to psychological changes, according to Smith and Morehouse (1962), who hold that the crucial phase of alcoholism, starting with loss of control signifies the end of the alcoholic's struggle with the inner voice of his conscience.

Experimental Research Related to the Loss of Control Concept

A search of selected, related, professional literature reveals few experimental research studies on loss of control in alcoholism. Studies which have been conducted are cited and the findings discussed. Additional research involving human subjects and related to the loss of control phenomenon are considered as are reports of recovered alcoholics alleged to have resumed normal drinking.

Marconi, Fink, and Moya (1967) attempted to reproduce the inability to stop ingestion of alcohol in alcoholics and found that some of the alcoholics consumed more alcohol than did others. This study involved 13 patients in a psychiatric hospital, seven of whom were classified as gamma alcoholics and six as delta alcoholics.

After four days of abstinence, each was permitted, in the presence of two observers, up to five grams of ethanol per kilogram of body weight as a 20 per cent solution. The patient was told that his manner of drinking was to be studied and that the entire bottle was at his disposal. In this study, the gamma alcoholic drank at least 0.124 grams per kilogram or more, and the delta alcoholics drank not more than 0.105 grams per kilogram. The total amount drunk by the gamma alcoholics was 19.98 grams and the delta alcoholics 2.88
grams with a statistically significant difference at the .0005 level. The gamma alcoholics drank frequently, complained of dry throat and mouth, wanted more alcohol, and displayed psycho-motor restlessness.

The subjects identified as gamma alcoholics were selected on the basis of a reported drinking history which included loss of control. Knowledge of this factor on the part of the subjects could tend to influence the drinking behavior of those subjects during the experiment.

Cutter, Schwaab & Nathan (1970) found no evidence to support the hypothesis that the ingestion of an initial drink of alcohol leads to a strong desire for more alcohol. Their research project included 32 alcoholics with a mean age of 36.75 years. In this study the subjects worked on a task to earn points that could be directly translated into differing amounts of 100 proof bourbon whiskey. The number of points and the amount of whiskey earned was related to the strategy employed by the subject in working the task. The subject was given an initial drink of bourbon and ice or ice water and then presented a task in which he was to determine which of two cars on a panel would win an imaginary race. Having decided, he pushed the panel on which his chosen automobile appeared. The correct choice would give him a green light and ten points. With an incorrect choice, ten points would be subtracted from the score. The subject was instructed to try to earn as many points as he could. The test was conducted with alcoholics and nonalcoholics. The authors suggested that lack of significant results raised questions as to the validity of the procedures employed in the study with the possibility
that the task might have been too complex for its purpose, or the
points or liquor may not have been sufficiently salient to the sub-
jects, in spite of efforts to make them so. The researchers found
no evidence to support the hypothesis that a drinking conflict
necessarily leads to a craving for alcohol, nor any evidence to
support the belief that the ingestion of an initial drink leads to
the strong wish for subsequent drinks. The craving for alcohol
among alcoholics may be relatively independent of any individual
drinking sequence. It may be related to the interaction of internal
physiological and psychological states with social and environmental
cues and with a schedule of reinforcement of drinking behavior.
The results of this study suggested that a single drink taken when
there is no craving need not produce excessive consumption. Un-
fortunately, the design of this research did not lend itself to a
clear assessment of the ethanol-induced loss of control concept for
the reasons specified by the researchers.

An experiment was set up by Merry (1966) to controvert the idea
of some students of alcoholism that as soon as a "loss of control"
type of alcoholic takes one drink, he is unable to control the quan-
tity of alcohol he ingests. Two strongly flavored mixtures were
prepared; one containing one ounce of vodka, the other no vodka. One
mixture was given daily at breakfast to nine alcoholics at the
addiction unit of the hospital for eighteen consecutive days, alter-
nating the drinks every two days, except that on the last day, an
extra ounce of vodka was added. The subjects were told that they had
received a special vitamin mixture to help them remain abstinent.
They were to report daily on the extent of craving for alcohol they experienced, graded or measured on a five point scale. The pooled craving scores turned out to be identical on alcohol and non-alcohol days. After 63 administrations of the vodka mixture, craving reactions occurred only 15 times; after 72 non-alcohol administrations, they occurred only 20 times. According to tabulated data, out of 9 two-ounce alcohol administrations, craving occurred 9 times. It was stated that these results therefore, do not bear out the established view that one drink of alcohol necessarily precipitates a hitherto abstinent loss of control drinker into a drinking bout. Further, it does not support the assertion that a small amount of alcohol triggers off a biochemical abnormality, assumed by some workers to be the basic cause of alcohol addiction. Psychological and environmental factors may be more important influences in initiating loss of control drinking.

This research was designed to measure the physiological effect of one drink of ethanol upon an alcoholic's craving or desire for a drink. Unlike the present study, however, it made no provision for the distinction between physiological and psychological factors, nor did it provide an opportunity for each subject to request a drink of alcohol if experiencing a strong desire for a drink.

Mendelson et al (1964) report no specific craving for alcohol in alcoholics who were receiving as much as 24 ozs. of whiskey per day on a controlled schedule. This experiment with 10 volunteer alcoholic subjects consisted of six equal doses of 36 proof whiskey given at four hour intervals over a period of 24 days. During the
early alcohol phase when 6 to 30 ozs. of whiskey per day were given for 5 days, there was essentially no change in the subjects with no evidence of inebriation or craving.

In the late alcohol phase when 40 ozs. of alcohol were given each day for 5 days there was marked inebriation. Social interaction and general activity decreased markedly. Craving for alcohol was clearly present but was associated with ambivalence.

The researchers concluded that certain facets of craving or need for alcohol by the alcoholic can be defined in terms of alcohol dosage and duration of drinking, but that it should not be assumed that a single drink or any given number of drinks automatically induces the onset of compulsive ingestion. In this experiment, craving for alcohol did not appear with the first drink as is sometimes alleged, but only after large quantities of whiskey were consumed over a period of many days. The research by Mendelson is the first reported in the literature where massive doses of alcohol were given to human subjects for an extended period of time. This research was not dealing specifically with the one-drink loss of control concept. Furthermore, each subject was aware that he was consuming alcohol, as part of the research project which could produce a "Hawthorne" effect. The design did not allow for a clear distinction between physiological and psychological effects of ethanol.

Further question on the one-drink loss of control concept as a physiological and/or psychological phenomenon is suggested on the basis of reports of alcoholics resuming controlled drinking. Seven per cent of a sample of 91 cases of alcoholism were able to resume
normal drinking without experiencing loss of control (Bailey & Stewart 1967). Likewise 4 of 7 successfully treated alcoholics and over half of another group of 29 alcoholics who had developed the ability to drink in normal fashion were reported by Cain (1964). Davies (1962) reported 7 out of 93 alcohol addicts had returned to normal drinking after a period of abstinence, and Fox and Smith (1959) compared first and second year follow-up studies on alcoholics, reporting that 24% of their total group had improved in the second year and were drinking. Moore and Ramseur (1960) found that 5 of 14 most improved patients in a group studied were well controlled social drinkers, and Lemere's (1963) research reports that 3% of problem drinkers returned to normal drinking.

Pattison, et al. (1968) refer to reports by Lambert, Shea, Norvig and Neilsen, Hacquarg, and Selzer and Holloway, who report varying percentages of alcoholics as returning to normal, controlled, moderate drinking. Kendell (1965) reported on four alcohol addicts who returned to normal social drinking for between 3 and 8 years, alleging that it should serve both to confirm and extend Bailey's findings.

According to Bailey and Stewart (1967), most studies find no more than a small minority of alcoholics able to resume normal drinking so that the general prescription of abstinence must stand, pending further knowledge. On the other hand, this minority has been discovered consistently enough to indicate a need for further research, designed specifically to elucidate the many questions posed in relation to the few alcoholics able to resume normal drinking.
Summary

The uncertainty surrounding the loss of control phenomenon in alcoholism is very evident, not only in the literature on the subject, but in the experiences of many having a problem with alcohol. Many people having opinions seem firmly convinced that they are correct. The presence of firm convictions regarding this concept and the absence of empirical evidence clearly call for further study of the problem.

Chapter III presents the design and methodology of the present research study investigating the one-drink loss of control phenomenon in alcoholism. It is believed that the design and methods employed provide adequate control for an investigation of the physiological and/or psychological effects of one drink of ethanol upon the alcoholic's desire for further ethanol intake.
CHAPTER III

DESIGN AND METHODOLOGY

An experimental research project was designed to investigate the ethanol-induced loss of control concept in alcoholism. The research project was conducted at the Battle Creek Sanitarium, an accredited and licensed medical institution, in Battle Creek, Michigan. The Battle Creek Sanitarium has, since 1965, offered a therapy program for the rehabilitation of alcoholics. The principal investigator has been the director of this program since its inception.

Selection of Subjects

Subjects selected for participation in this study were all patients admitted to the hospital with the diagnosis of alcoholism, under the three participating staff physicians. It was deemed important to have immediate and open communication among the subjects, physicians, investigator and assistants, in the best interest of both the subjects and the study. Each of the three participating physicians has his office in the institution. Alcoholic patients admitted by other physicians during the term of this study were not considered for inclusion in the project due to problems of control and communication. While it required more time to conduct the study with only three physicians, it did insure much better control and supervision of all aspects of the study.
All alcoholic patients admitted by the participating physicians during the duration of this project were included in the study except those who were exempted on the basis of the following criteria: (1) patients who refused to sign a statement of willingness to participate in the alcoholism research project; (2) patients who on the fifth day were experiencing marked visible alcohol withdrawal symptoms, including tremors, shakes, visual or auditory hallucinations, or delirium tremens; (3) patients whose medical condition required any medication between the hours of 6:00 a.m. to 10:00 a.m. on the fifth day of their hospitalization; and (4) patients whose medical condition had not permitted an examination by their physicians sufficient to provide medical clearance for participation in the project.

These criteria were established before the project was initiated and were adhered to carefully throughout.

Each subject in this study was cleared and recommended for participation by his physician. The physician's approval indicated that the subject was a hospitalized alcoholic patient in whom the ingestion of up to one ounce of ethanol would have no adverse effect, nor would it interfere in any way with the therapeutic regimen essential to the best interests and well-being of the patient. All patients so cleared were randomly assigned to one of the four groups.

Prior to each subject's participation in the study, and as early as possible after his admission to the hospital, he was interviewed by the investigator or his assistant.

During this interview the patient was told:

We are attempting to learn more about alcoholism and are
doing a research study which will help us in this. We are asking certain patients to help us in this project and we would like to enlist your help. Because of the nature of the project, we cannot say anything more about it except that it will not hurt. There is no harm or danger of any kind involved. In fact, you probably will not be able to tell that you are in it. We are, however, required to speak with you about it and to get your permission if you are to participate.

At this point, a form (see Appendix, p. 91) was presented to the patient for his signature.

Assignment of Subjects

Subjects agreeing to participate in the research project and receiving medical clearance from their physicians were randomly assigned into one of four groups designated as A, B, C, and D. The random assignment was made by the investigator and an assistant with the use of a die upon which the groups A, B, C, D had been imprinted; one on each of four sides. The two remaining sides of the die were not considered in this assignment process. The subjects were assigned to the groups in the order in which they were admitted to the hospital, as indicated by the die as it came to rest on top of the table (see Appendix, p. 97).

Four groups were utilized in this study in order to provide adequate control and to test the stated hypotheses. Group A was considered the control group, while groups B, C and D were designated to experience the differing effects of the manipulated independent variables.

The independent variables in this study were one ounce of 100 proof vodka disguised or concealed in a "vitamin mixture" made up of
½ oz. of Stewart's liquid vitamin formula, 4 oz. of grapefruit juice, and 1 oz. of cranberry juice, and information given to the subjects. The effectiveness of the mixture as a concealant of alcohol was measured with the help of eight members of a graduate research seminar at Western Michigan University. The eight students, all of whom were familiar with the taste and smell of ethanol were given the opportunity of smelling and tasting the mixture served in containers of two different sizes. They knew that the mixture in either the large glasses or the small glasses contained vodka in the same proportion as used in this study. The students tasted and smelled several times and made their selections. Four of the graduate students indicated that the alcohol was in the mixture contained in the small glasses and four of the students indicated that the alcohol was in the mixture contained in the large glasses. This test indicated that the students' ability to identify the mixtures containing alcohol was no better than that which would be expected by chance (.50). This test was much more stringent than in the actual study since the students knew that there was alcohol present. At the time of administration, the subjects were not aware of its presence.

Experimental Procedures

The "vitamin mixture" without alcohol was given to subjects in group A, the control group. The mixture was administered as a routine medication with no information about alcohol provided. The subjects in group B received the independent variable (1 oz. of 100 proof vodka) disguised in the "vitamin mixture" with no knowledge or indication of any kind.
that they had received alcohol. Group C subjects received alcohol (1 oz. of 100 proof vodka) in the "vitamin mixture" and, in addition, were informed 40 minutes after receiving it, prior to filling out the first response form, that they had consumed one drink of alcohol.

The subjects in group D received the "vitamin mixture" without alcohol but were informed that they had consumed one drink of alcohol. This information was given 40 minutes after the ingestion of the "vitamin mixture."

Table 1 provides an outline of experimental procedures of this project.

Information given to subjects in groups A and B (see page 46) was exactly the same. It was read to them by one of the two medication nurses or by the nursing supervisor.

The information given to subjects in groups C and D was identical for them but different from that which was given to the subjects in groups A and B (see page 46).

This project was conducted on a partial double blind basis with the subjects in groups A and B not informed of the alcohol. They were given no information concerning its presence or absence. The subjects in group C were informed of their alcohol ingestion, and the subjects in group D experienced a placebo effect (informed they had consumed alcohol but in actuality they had not).

The "vitamin mixture" was administered by one of the two medication nurses who did not know the contents of the mixture. There was no way to prevent the nurse from distinguishing between the treatment of A and B as opposed to C and D, but she was unable to
TABLE 1
An Outline of Experimental Procedures

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group. No alcohol, no information given regarding alcohol</td>
<td>1 oz. vodka. Subjects are not informed they have consumed alcohol</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 oz. vodka. Subjects are informed they have consumed alcohol.</td>
<td>No alcohol. Subjects informed they have consumed 1 drink alcohol.</td>
</tr>
</tbody>
</table>

- **Day 4**: Questionnaire II
- **Day 5, 7 a.m.**: "Vitamin Mixture" administered
- **Day 5, 7:40 a.m.**: Behavioral Test (offered drink until noon) Questionnaire I
- **Day 5, 10 a.m.**: Questionnaire II
- **Day 5, 12 noon**: Behavioral Test terminated
- **Day 5 or 6**: Tennessee Self Concept Scale administered Questionnaires III and IV

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distinguish between A and B, or between C and D. The procedure
insured the double blind aspect of the administration of the mani-
pulated variables.

The measurement of the dependent variable (the subject's desire
or urge for a drink of ethanol) included questionnaires administered
at different specified times to each subject, and a behavioral-type
measure in which each subject was given an opportunity to request a
drink of alcohol until 12 noon on the day of the test. On each sub-
ject's fourth day in the hospital, he was administered questionnaire
#2 (see Appendix, page 88) which was designed to measure the depen-
dent variable (desire for a drink of beverage alcohol) in each sub-
ject. This questionnaire also provided a measurement scale for each
subject's desire for food, and his nervous state. These two items
were included in an effort to de-emphasize the measurement of the
dependent variable.

Questionnaire #2 was administered on each subject's fourth day
of hospitalization primarily for two reasons: (1) to familiarize
each subject with the questionnaire, and hopefully reduce the possi-
bility of any "Hawthorne" effect as a result of the testing activi-
ties on his fifth day in the hospital; and (2) to provide data on
the dependent variable which could be statistically analyzed with
the same data from the fifth day.

Questionnaire #2 was designed to measure the dependent variable
in each subject on a scale from one to four. Subjects indicating no
desire for a drink of beverage alcohol checked a box to which a value
of one had been assigned. Subjects indicating a slight desire for a
drink of beverage alcohol checked a box to which a value of two had been assigned. Subjects indicating a very strong desire for a drink of beverage alcohol checked a box to which a value of three had been assigned, and subjects indicating an almost uncontrollable desire for a drink of beverage alcohol checked the box to which a value of four had been assigned. The number values did not appear on the questionnaires and the subjects had no knowledge of them. The one to four scale was followed on each of three questionnaires.

At 7:00 in the morning on each subject's fifth day in the hospital, he was directed to the treatment room near the nurses station. Here he was met by one of two medication nurses who administered the specified "vitamin mixture." The medication nurses made no comments upon the "vitamin mixture" unless they were questioned regarding it. In this case, they would respond that it was a "vitamin mixture" which had been prescribed by the subject's physician.

After the "vitamin mixture" had been ingested in the presence of the nurse, the subject was instructed not to leave the floor for any reason without checking with the nurse. A forty minute time lapse after the ingestion of the "vitamin mixture" was judged to be the best approximate time in which the effects of the ingested alcohol would have reached its strongest concentration in the subject's blood stream. The forty minute time delay was arrived at after a personal telephone conversation with Dr. Richard Bates, internist and specialist in alcoholism at Sparrow Hospital in Lansing, Michigan, a personal interview with Dr. Russell T. Smith of the Battle Creek Sanitarium, and research information (McCarthy 1964).
The subject returned to the treatment room forty minutes after his "drink" where either the medication nurse or the supervising nurse read to him the information accompanying the "vitamin mixture" for his group. For groups A and B the information was as follows:

We are attempting to learn more about helping people having problems with alcohol, as well as to prepare you for life outside the hospital. If any time between now and 12 noon today you feel a stronger than usual urge or desire for a drink of alcohol, you may request one at the alcoholism therapy room on the fifth floor. Please remember it is very important that you do not discuss this plan at any time with others, especially any of the other patients in the alcoholism program. Some of them are not having the opportunity of this experience and they might misunderstand or be disappointed. If you do have any questions, please feel free to discuss them with your physician, the program director, Mrs. Reynolds, or Mrs. Lantz only. Again, we cannot stress too much the importance of your not discussing this with anyone except those specified. Remember, you may have a drink of alcohol up till 12 noon today if you feel a stronger than usual urge or desire for one. Please help us now by filling out the questionnaire which has just been handed to you.

For groups C and D, the information was as follows:

As part of your treatment, this morning you have consumed an amount of alcohol equal to one drink. Please help us by responding to the questionnaire which has just been handed to you. In addition, if any time between now and 12 noon today you feel a stronger than usual urge or desire for a drink of alcohol, you may request it at the alcoholism therapy room on the fifth floor. Please remember, it is very important that you do not discuss this plan at any time, with any others, especially any of the other patients in the alcoholism program. Some of them are not having the opportunity of this experience and they might misunderstand or be disappointed. If you do have any questions, please feel free to discuss them with your physician, the program director, Mrs. Reynolds, or Mrs. Lantz only. Again, we cannot stress too much the importance of not mentioning to anyone, except those specified, that you have had a drink or that you may have another one up till 12 noon today if you feel a stronger than usual urge or desire for one.

After ascertaining that the subject understood what he had heard,
the nurse then presented questionnaire #1 which measured the dependent variable for that specific time.

The physician's orders for each subject stated no medication between the hours of 6:00 a.m. and 10:00 a.m. on the fifth hospital day. Each subject's breakfast was held until after he had completed questionnaire #1. This was done to provide an optimum rate of alcohol absorption in each subject, with a minimum of variance among the subjects due to any differences in the kind or amount of food in their stomachs which would affect the absorption rate.

Upon the completion of questionnaire #1, the subject was given his breakfast and permitted to follow his regular scheduling until 10:00 a.m. when he was presented questionnaire #2 by the investigator or his assistant. Questionnaire #2 measured the dependent variable in each subject at a time when under the specified control conditions it could be safely assumed that the effects of the alcohol on the subject would no longer be measurable. The measurement was taken at this time to cover the subject's desire for a drink during the time in which his system was influenced by the ethanol, and including up to an hour or more of time in which his system was virtually free of that influence.

Upon completion of questionnaire #2, the subject was permitted to follow his regular schedule. The subjective measurement of the dependent variable was completed with questionnaire #2, but the behavioral measurement remained in effect for another two hours until 12:00 noon. Details on the behavioral test follow.

From the approximate time of the highest concentration of ethanol
in each subject's blood stream at 7:40 until 12:00 noon, each subject had the opportunity, if he desired, to request a drink of alcohol at the alcoholism therapy room from the investigator or his assistant. Subjects experiencing a stronger-than-usual desire for a drink of alcohol were measured on a scale from 0 to 4. Subjects who did not appear at the therapy room to request a drink were given a score of 0 on the behavioral test. Subjects who reported to request a drink were required to respond in the affirmative to questions designed to measure their strength of desire and/or determination to receive a drink. (See Appendix, p. 92).

Minimal persistence in seeking a drink at the therapy room was given a value of #1, with maximum persistence a value of #4. Any subject requesting a drink was confronted with the questions as long as he insisted upon his need for a drink or until he disagreed with one of the questions in the scale. The subject's degree of insistence was indicated by the highest number (1, 2, 3, or 4) to which the subject was willing to agree. The scale follows:

Response #1: You think you need a drink?
Response #2: You don't really want a drink, do you?
Response #3: You are very sure that you want a drink right now?
Response #4: There is no question about it, then you do want a drink right now and you are willing to sign a statement saying you had to have a drink of alcohol?

Attempts to measure the dependent variable in each subject were concluded at 12:00 noon on the fifth hospital day.

Data which were gathered on the afternoon of the fifth day or on the sixth day or hospitalization for each subject included a measurement of the subject's self concept, using the *Tennessee Self*
Concept Scale, a third questionnaire (#3) to determine the subject's belief regarding the one-drink loss of control concept, and a questionnaire measuring his understanding of the Alcoholics Anonymous approach.

The Tennessee Self Concept Scale was developed by Pitts (1965) to meet the need for an instrument to measure the self concept which would be simple for the subject, widely applicable, well-standardized and multidimensional in its description of the self concept. The scale consists of 100 self descriptive statements which the subject uses to portray his own picture of himself. It includes a measure of total self esteem which is used in the data analysis.

Questionnaire #3, designed with the same format as questionnaires #1 and 2, measured the subject's reported belief regarding the dependent variable (an alcoholic's desire for alcohol) when an alcoholic consumes as little as one drink of beverage alcohol. (See Appendix, p. 89). Questionnaire #3 recorded data to be used in computing a correlation between the belief and experience of subjects in groups B, C and D. It also included measurements on two other concepts for reasons previously presented.

Questionnaire #4 was designed to measure the subject's understanding of the Alcoholics Anonymous approach and philosophy. (See Appendix, p. 90). Patients were questioned regarding their attendance at A. A. meetings and were given an opportunity to describe the differences between open and closed A. A. meetings. This information was compiled in order to compare the beliefs regarding the one-drink loss of control concept of alcoholics who are familiar with
The A. A. philosophy with the beliefs of alcoholics who are not familiar with A. A.

In addition to medical supervision, a physical examination, and participation in the alcoholism recovery program, each subject was given a personal history interview which provided data on employment, education, age, marital status, and extent of his drinking problem.

Data Analysis

The hypotheses of this study were analyzed statistically by a one-way analysis of variance model, t tests, a product moment correlation coefficient, and an omega square estimate on strength of association. The analysis of variance model was a one-way four-level design used to determine the effect of the manipulated variables (1 oz. of 100 proof vodka and information given to the subjects) on the dependent variable (strength of desire for alcohol as measured by the questionnaire) (Kerlinger, 1964).

The t tests were used as follows:

To test the relation between the subjects' belief regarding the one drink loss of control phenomenon and their actual experience in this study.

To test the relation between one oz. of alcohol and/or information given the subjects and their desire for alcohol.

To compare what was believed regarding the one drink loss of control concept of those subjects having a knowledge of the A. A. philosophy with what was believed by those subjects who were not familiar with A. A.

To test the relationship between the subjects' desire for alcohol on the fourth hospital day and their fifth day (test day) in the hospital.
The omega square model was used to measure the strength of association of the independent and dependent variables (Hays 1963).

A product-moment correlation coefficient determined the extent of the relationship between the ages of the subjects and their self concepts.

The subjects' responses to the questionnaires were studied by the investigator in an attempt to identify any areas in which a misunderstanding might have existed, and to identify any contradictory responses. Personal interviews with subjects providing apparent contradictory responses furnished additional information which is discussed in Chapter V.
CHAPTER IV

RESULTS

The data obtained from the measuring procedures described in Chapter III were analyzed by a one-way analysis of variance, t tests, an omega square model, and a Pearson product-moment correlation coefficient.

The one-way, four level analysis of variance model was used to determine the relation between the manipulated variables (1 oz. of 100 proof vodka and information given to the subjects), and the dependent variable (the subject's reported desire for alcohol).

The t test comparisons were computed on all combinations of cells on the dependent variable. They were also used to compare the subjects' belief and experience regarding the one-drink loss of control concept in alcoholism, and fourth and fifth day desire for alcohol. Belief regarding the one-drink loss of control concept was compared between subjects familiar with the A. A. philosophy and those who were not acquainted with the A. A. philosophy.

The omega square model was used to estimate the strength of association in determining the amount of variance of the dependent variable accounted for by the treatment (Hays 1963).

The Pearson product-moment correlation coefficient was used to indicate the strength of relationship between the subjects' ages and self-esteem as measured by the Tennessee Self Concept Scale.
Data Presentation

Investigators have traditionally stated the level of significance at which the null hypothesis would be rejected prior to conducting the study. Generally, either the .05 or .01 levels of probability are selected.

It is held by Winer (1962) that .20 or .30 levels of significance may be more appropriate than .05 and .01 levels when type I (rejecting Ho when it is true) and type II (failing to reject Ho when it is not true) errors are of approximately equal importance.

The data presentation of this study follows the recent trend in behavioral science research, which is to report the findings and the level at which the null hypothesis can be rejected.

A measure of the strength of association between variables is frequently a meaningful addition to the statistical analysis. "Statistical significance is not the only, or even the best, evidence for a strong statistical association" (Hays, 1963, p. 328).

The omega square estimate of strength of association indicates how strong an association appears to be. A better decision can be made in terms of significance level and estimated strength of relation than by taking either one alone (Hays, 1963).

Ordinarily, according to Courts (1966), it is legitimate to single out large mean differences for special attention only if the overall F turns out to be significant. He cites the only exception to be "where theoretical considerations have led the experimenter to predict before the data have been observed, that certain differences will be found" (p. 273).
When such predictions have been made, it is proper to attach significance to differences in the predicted direction even though the overall F is not significant (Courts, 1966; Kerlinger, 1964).

The estimated strength of association of the independent and dependent variables of this study is reported, as are t ratio comparisons and a product-moment correlation coefficient. A discussion of the meaning, significance, and implications of this data and recommendations for application and future research are found in Chapter V.

The Ethanol-Induced Desire for Alcohol

The three hypotheses, stated in the null form, in which the subjects' desire for alcohol was the dependent variable were:

Ho1: There is no physiological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

Ho2: There is no psychological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

Ho3: There is no combined physiological and psychological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

The other null hypotheses tested were:

Ho4: There is no relation between what an alcoholic believes regarding an alcoholic's desire to drink upon the ingestion of one drink of alcohol and the desire he actually experiences when he has had one drink.

Ho5: There is no relation between the alcoholic's self concept and his age.

Ho6: There is no difference between alcoholics who are A. A. oriented and those who are not A. A. oriented, in their
belief regarding the ethanol-induced loss of control concept in alcoholism.

$H_0_1$, $H_0_2$, and $H_0_3$ were analyzed by a four-level, one-way analysis of variance model, t tests on all possible two cell comparisons, and the omega square for estimated strength of association. The results of the one-way analysis of variance are presented in Table 2.

**TABLE 2**

Analysis of Variance on Desire for Alcohol

<table>
<thead>
<tr>
<th>Group</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>N:</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>M:</td>
<td>1.3</td>
<td>1.0</td>
<td>1.7</td>
<td>1.5</td>
</tr>
<tr>
<td>SD:</td>
<td>.60</td>
<td>.00</td>
<td>.78</td>
<td>1.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>P=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>3</td>
<td>2.67</td>
<td>.89</td>
<td>1.589</td>
<td>.25</td>
</tr>
<tr>
<td>Within groups</td>
<td>36</td>
<td>20.20</td>
<td>.561</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>22.87</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The data in Table 2 reveal group differences at the .25 level of significance. That is, if there is, in fact, no relationship between one ounce of alcohol ingested by the alcoholic and/or information given to the alcoholic and his desire for alcohol, then the observed mean differences could be expected to occur by chance less than 25 times in 100.

The three hypotheses were considered individually through the use of $t$ ratio comparisons between all possible combinations of the groups. Table 3 contains data and results of the $t$ ratio comparisons.
which are specifically related to one or more of the three hypotheses.

TABLE 3
The \(t\) ratio Group Comparisons on Desire for Alcohol

<table>
<thead>
<tr>
<th>Test</th>
<th>Groups Compared</th>
<th>Means of Groups</th>
<th>SEDM</th>
<th>(t)</th>
<th>(P=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A &amp; B</td>
<td>1.3</td>
<td>1.0</td>
<td>.2000</td>
<td>1.500</td>
</tr>
<tr>
<td>2</td>
<td>A &amp; C</td>
<td>1.3</td>
<td>1.7</td>
<td>.3282</td>
<td>1.218</td>
</tr>
<tr>
<td>3</td>
<td>A &amp; D</td>
<td>1.3</td>
<td>1.5</td>
<td>.3958</td>
<td>.505</td>
</tr>
<tr>
<td>4</td>
<td>B &amp; C</td>
<td>1.0</td>
<td>1.7</td>
<td>.2603</td>
<td>2.688</td>
</tr>
<tr>
<td>5</td>
<td>B &amp; D</td>
<td>1.0</td>
<td>1.5</td>
<td>.3415</td>
<td>1.463</td>
</tr>
<tr>
<td>6</td>
<td>C &amp; D</td>
<td>1.7</td>
<td>1.5</td>
<td>.4294</td>
<td>.465</td>
</tr>
</tbody>
</table>

Test 1 compares the means of groups A and B on desire for alcohol (A, the control group, and B, the group which received alcohol without the subjects' knowledge). (\(P=.20\)).

On the basis of chance, if no actual differences existed, the expected probability of finding differences as great as those found between groups A and B would be less than 20 out of 100.

An examination of the means measuring the dependent variable reveals no desire for alcohol experienced by those who received it without their knowledge, and some desire on the part of those in the control group who did not receive alcohol.

Text 2 compared the means of groups A and C on desire for alcohol (A, the control group, and C, the group which received alcohol with their knowledge). (\(P=.30\)).

The comparison indicates that if there is, in fact, no psychological nor physiological, nor combined psychological and
physiological relation between one drink of alcohol and desire for alcohol, mean differences as great as those found could be expected to occur by chance not more than 30 times in 100.

Test 3 compared the means of Groups A and D (A, the control group and D, the group which experienced the placebo effect).

This comparison measures the psychological relation of alcohol upon the subjects' desire for further alcohol intake as compared with the control group. (P = .70).

The mean differences attained between groups A and D are no greater than would be expected to occur on the basis of chance.

Test 4 compared the means of groups B and C (B, the group which received alcohol unknown to them, and Group C, which received alcohol and were so informed).

This comparison measures the relation of the information regarding one drink of alcohol ingested, on the dependent variable (desire for alcohol). (P = .02). The group mean differences are significant at the .02 level of statistical probability.

This finding indicates that if there is in fact no relation between the information given regarding one drink of alcohol ingested, and desire for alcohol, that differences as large as those found between the means of groups B and C could be expected to occur by chance no more than 2 times out of 100.

Test 5 compared the means of groups B and D (B received alcohol unknown to them, and D were informed they had received alcohol but in fact, had not). (P = .20).

The group mean differences measuring the relation of one drink
of alcohol and information on alcohol ingestion are significant at
the .20 level. The probability of differences as great as between
the two group means occurring by chance, if in fact no differences
exist, is less than 20 out of 100.

Test 6 compared the means of groups C and D (group C consumed
one drink of alcohol and were so informed, and group D did not re-
ceive alcohol but were informed that they had consumed one drink).
(\(P = .70\)).

Subjects in groups C and D shared a common variable (informa-
tion on alcohol ingested). Subjects in group C also experienced the
effects of an additional variable (1 oz. of alcohol), both groups
experienced desire for alcohol. The statistical probability of mean
differences as large as those occurring between groups C and D is
.70. Differences occurring between groups C and D are no greater
than would be expected to occur by chance.

The strength of statistical association between the independent
and dependent variables was estimated by an omega square model (Hays
1963).

Comparisons were made on all possible 2-cell combinations.

Table 4 gives the estimated strength of association data on each
of the six comparisons.

A strong association is indicated between the independent and
dependent variables of test 3 which includes groups B and C.

Group B had alcohol and did not know it. Group C had alcohol
and knew it. The manipulated variable in this case was the informa-
tion given to the subjects in group C regarding the alcohol they
The best estimate is that the information given to the subjects accounts for 24% of the variance in their scores on the dependent variable (strength of desire for alcohol) as measured by the questionnaire. Since the subjects in both groups received alcohol, the information given to subjects in group C provided opportunity to test for the strength of association between a psychological relation of alcohol and desire for alcohol.

The results of the omega square comparisons of tests 1, 2, 3, 5, and 6 showed minor strengths of association of 6% or less.

An examination of the data comparing the subjects' desire for alcohol on the fourth day in the hospital with the fifth day (treatment day) reveals differences significant at the .10 level.

A t test was used to compare the fourth day means on desire for alcohol with the fifth day means, both individually and totally.

Table 5 contains the data on fourth and fifth day desire.
TABLE 5
Comparisons of Fourth and Fifth Day Desire for Alcohol

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean 4th Desire</th>
<th>Mean 5th Desire</th>
<th>df</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.1</td>
<td>1.3</td>
<td>9</td>
<td>-0.8944</td>
<td>(.4)</td>
</tr>
<tr>
<td>B</td>
<td>1.2</td>
<td>1.0</td>
<td>9</td>
<td>1.500</td>
<td>(.2)</td>
</tr>
<tr>
<td>C</td>
<td>1.2</td>
<td>1.7</td>
<td>9</td>
<td>-1.709</td>
<td>(.2)</td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>1.5</td>
<td>9</td>
<td>-1.463</td>
<td>(.2)</td>
</tr>
<tr>
<td>Total</td>
<td>1.12</td>
<td>1.37</td>
<td>39</td>
<td>-1.891</td>
<td>(.1)</td>
</tr>
</tbody>
</table>

The data reveal that the probability of total mean differences the size of those obtained between day four and day five on strength of desire for alcohol would be likely to occur by chance less than 10 out of 100 times if no differences actually existed. (P = .10).

Considering the groups separately reveals no significant difference between day four and day five desire for alcohol for subjects in the control group.

Group B mean differences were significant at the .20 level. It should be noted that these differences were in the direction of less desire for alcohol on day five, the treatment day, than on day four. This is in the opposite direction of the other three groups. It is also opposite the direction to be expected if there were in fact a physiological relation between one drink of alcohol and increased desire for alcohol.

Mean differences for day four and day five were in the direction of greater desire on day five (treatment day) for both groups C and D and were significant at the .20 level. The probability of
obtaining differences on the dependent variable between days four and five on the basis of chance expectancies would be less than 20 out of 100, if there were in fact no actual differences.

Summary of Data on Desire for Ethanol

The data analysis failed to provide support for rejection of Ho₁ at better than a .30 level of statistical probability.

Ho₁: There is no physiological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

Ho₂: is rejected at the .02 level of confidence as indicated by the t ratio on groups B and C.

Ho₂: There is no psychological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

The results of the omega square computation indicate the manipulated independent variable (information regarding one drink of alcohol ingested) accounts for 24% of the variance of the dependent variable (desire to drink).

Ho₃: There is no combined physiological and psychological relation between one drink of ethanol ingested by the alcoholic and the strength of his desire for further ethanol intake.

A combined physiologically and psychologically related desire for further ethanol intake with one ounce of alcohol ingested was not supported beyond the .30 level of probability as indicated by the t ratio comparison of groups A and C.
Belief and Experience

Ho$_4$ was tested by means of a t ratio comparing belief scores with actual experience scores within groups B and C. Group D was tested for their belief regarding this concept compared with their placebo experience.

Ho$_4$: There is no relation between what an alcoholic believes regarding an alcoholic's desire to drink upon the ingestion of one drink of alcohol and the desire he actually experiences when he has had one drink.

Subjects in groups B and C had consumed one ounce of alcohol and had responded to a questionnaire measuring their desire for alcohol, and another questionnaire measuring their belief regarding the ethanol-induced loss of control concept. The subjects in group D responded to the same questionnaire, however, they were informed that they had consumed alcohol when, in fact, they had not.

Table 6 contains the data on comparisons of the alcoholics' belief with their actual experience.

### TABLE 6

A Comparison of Alcoholics' Belief and Experience Regarding the Ethanol-Induced Loss of Control Concept

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean Belief</th>
<th>Mean Experience</th>
<th>t</th>
<th>P=</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>10</td>
<td>3.1</td>
<td>1.0</td>
<td>-11.69</td>
<td>.001</td>
</tr>
<tr>
<td>C</td>
<td>10</td>
<td>3.6</td>
<td>1.7</td>
<td>-6.18</td>
<td>.001</td>
</tr>
<tr>
<td>D</td>
<td>10</td>
<td>3.0</td>
<td>1.5</td>
<td>-3.30</td>
<td>.005</td>
</tr>
</tbody>
</table>

The differences between what the alcoholic believes regarding...
the one-drink loss of control concept and what he actually experiences are significant at better than the .001 level. A value of \( t \) as large as the obtained values could be expected to occur by chance on the basis of statistical probability less than one time in 1,000 if there were in fact no differences between their belief and experience.

A psychological relation between information provided and desire for alcohol is evident in differences between belief and experience as shown in group D. (\( P = .005 \)).

Although a highly significant difference was found, it was not as high as in the groups which had actually consumed alcohol. The direction of this finding compared with the results of groups B and C tends to support a relation between information given on alcohol ingestion (psychological effect) and an alcoholic's desire for alcohol.

The hypothesis \( H_0^1 \) (there is no relation between the alcoholic's belief and experience regarding the one-drink loss of control concept) is supported at the .001 level of confidence. It is evident that there is a very significant difference between what the alcoholic believes regarding the ethanol-induced loss of control concept and the desire he actually experiences when he has consumed one drink of alcohol.

**Age and Self Concept**

\( H_0^2 \) states there is no relation between the alcoholic's self concept and his age.
A Pearson product-moment coefficient correlation between the ages and self concepts of all subjects resulted in a correlation coefficient of \( r = -.109 \) \( r^2 = .01 \). This signifies that there is a very weak negative correlation between the ages of the subjects and the strength of their self-esteem. It would not be possible to predict an alcoholic’s age by knowing his self-esteem level or vice versa.

The coefficient squared \((r^2)\) gives the proportion of variance in \( y \) (self concept), associated with \( x \) (age), which is 1\%.

These data reveal that \( H_0 \) cannot be rejected at a statistically meaningful level.

Alcoholics Anonymous and Non-A. A. Comparisons

The general acceptance of the one-drink loss of control concept by alcoholics who are A. A. oriented is well established in the literature. The extent of this belief by non-A. A. oriented members apparently is not reported in the professional literature.

This study permitted a comparison of the beliefs of the two groups, A. A. and non-A. A. oriented, to investigate whether or not there is a relation between their beliefs on this concept.

A \( t \) ratio was used to compare belief on the ethanol-induced loss of control concept of A. A. oriented subjects with non-A. A. oriented subjects.

Table 7 contains the data for this investigation.
TABLE 7
A Comparison of the Beliefs of A. A. and Non-A. A.
Subjects regarding the Ethanol-Induced
Loss of Control Concept

<table>
<thead>
<tr>
<th>A.A.</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>SEDM</th>
<th>t</th>
<th>P=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>16</td>
<td>3.31</td>
<td>.68</td>
<td>.234</td>
<td>.621</td>
<td>(.6)</td>
</tr>
<tr>
<td>No</td>
<td>24</td>
<td>3.16</td>
<td>.74</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is no significant difference between the beliefs of A. A.
oriented and non-A. A. oriented alcoholics regarding the one-drink
loss of control concept. (P = .60).

H₀₆: There is no difference between alcoholics who are
A. A. oriented and those who are not A. A. oriented,
in their belief regarding the ethanol-induced loss
of control concept in alcoholism.

The results fail to support rejection of H₀₆ at a statistically
meaningful level.

SUMMARY

A one-way analysis of variance, t test, omega square model,
and a product-moment correlation coefficient were used to analyze
the data obtained from the measuring procedures described in Chap­
ter III.

The findings of the investigation were presented under the
following headings: The ethanol-induced desire for alcohol, belief
and experience, age and self concept, and A. A. - Non-A. A. com­
parison on the loss of control concept.

The hypotheses of each variable were presented along with a
statement of the level of probability at which they could be re-
jected. Strength of association between variables and a coeffi-
cient of correlation were discussed.

Chapter V contains the overall summary, discussion, and
recommendations for possible application, and future research.
CHAPTER V

SUMMARY, DISCUSSION, AND IMPLICATIONS

Summary

The literature reveals confusion and disagreement regarding the influence of a small amount of alcohol upon an alcoholic's desire for more alcohol. There seems to be general agreement among many alcoholics that as little as one drink of ethanol will set off a strong or uncontrollable urge for more ethanol. This problem, about which there has been little reported research, may hold important implications for therapy in alcoholism. It is conceivable that attitudes regarding the ethanol-induced loss of control concept could hinder investigations seeking significant factors in the etiology of alcoholism.

The literature recommends investigation of various factors which may be involved in the etiology of alcoholism (Clinard, 1964; Mendelson, 1968; Cain, 1967; Hayman, 1966).

The present study was undertaken to investigate the relation between one drink of ethanol and desire for ethanol in alcoholics. The questionnaire used in the study to measure desire for alcohol was designed to register responses on a scale from one to four.

In addition, subjects were given the opportunity to request one drink of alcohol on the treatment day, if they felt a strong or uncontrollable desire for alcohol. This procedure provided a behavioral measure on the dependent variable.
The *Tennessee Self Concept Scale* (Fitts, 1965) was used to acquire a measure of self-esteem for each subject. Additional information which had no influence on the scores of the dependent variable was gained through personal interviews with subjects after the testing experience was completed.

Information gained from the personal interviews provided insights which are discussed in the following section.

The subjects used in the present study were 40 hospitalized patients, each with a diagnosis of alcoholism. All subjects had been hospitalized specifically for alcoholism with referral to the alcoholism therapy program.

The dependent variables in this study were compared by means of a one-way analysis of variance, *t* tests and omega square for strength of association. The *t* tests were also used in analyzing data on subjects' belief and experience regarding the one-drink loss of control concept in alcoholism, and the beliefs of A. A. oriented and non-A. A. oriented subjects. A product-moment correlation coefficient was used to determine the extent of relationship between subjects' ages and self concept.

**Discussion**

The results of the present study support the theory that the alcoholic's desire for alcohol increases when he has been informed that he has ingested alcohol, whether or not he has, in fact, consumed any alcohol.

Subjects who received alcohol without their knowledge indicated
no desire (mean 1.0). Those who received alcohol and were so in-
formed indicated an increased desire (mean 1.7). Those who were
informed they had ingested alcohol but in fact had not, indicated
an increased desire (mean 1.5). Control subjects indicated a mean
desire of 1.3 on the fifth day (treatment day), a difference of .2
over the desire of the fourth day. The difference in desire for
alcohol on day four and day five for the subjects in the control
group was not at a statistically meaningful level.

Subjects in group B indicated less desire for alcohol on the
treatment day (day five) than on day four, with a mean difference
of -.2. The difference is significant at the .20 level of proba-
bility and fails to support the theory that an alcoholic's desire
for alcohol is increased due to a physiological effect of alcohol.
This finding tends to indicate a reduction in desire for ethanol
based on physiological factors alone.

Subjects in group C indicated a mean desire for alcohol of 1.2
on day four, and 1.7 on day five (treatment day), for a mean increase
in desire of .5. These differences between day four and day five
desire are significant at less than a .20 level of probability.

The differences in desire for alcohol, significant at less than
a .20 level of probability of the three treatment groups, but not
the control group, reveal that the manipulation of the treatment
was effective at the .20 level of confidence.

Comparisons of desire for alcohol on day four with day five and
all cell comparisons of fifth-day desire for group B fail to support
the theory that one drink of alcohol physiologically induces a desire

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for alcohol.

The data supports the presence of a psychological relation between alcohol and the desire for alcohol, whether or not it is actually ingested. Groups C and D believed they had ingested alcohol. Group C had, but group D had not consumed alcohol. Both groups had a mean increase in desire for alcohol of .5 on day five (treatment day) over day four. This difference is statistically significant at the .20 level of confidence. The difference between the responses of group C and D on the dependent variable, on the treatment day was not statistically significant (P=.70).

Differences between groups B and C were significant at the .02 level of confidence. Differences between groups B and D were significant at the .20 level of confidence. The omega square analysis lends support to the existence of a psychological relation between ingested alcohol and increased desire for alcohol with an estimate of the strength of association between treatment effect and desire for alcohol.

Strong associations were indicated in the omega square computation between groups B and C. In this analysis, the information given that alcohol had been ingested, accounted for 24% of the variance of the scores on desire for alcohol.

The findings of this study support the theory that one drink of alcohol induces an increased desire for alcohol in the alcoholic. The data suggest, however, that the increased desire for alcohol is based on the belief of its presence, rather than its actual physical presence and chemical effect upon the organism.
The results of this study failed to support the allergy and hypersensitivity theories that one drink sets off an abnormal physical reaction increasing the desire for alcohol in the alcoholic (Williams, 1960; Doe, 1957; Williams, 1951; Hanners, 1966; Lamb, 1955; Riley, 1950; Habas, 1956; Rush, 1943).

The findings reveal that one factor which significantly influences the alcoholic's increased desire for alcohol after he has had one drink, is his having been informed that he has consumed a drink. This finding reveals knowledge of alcohol ingested to be a factor significantly related to the reactions reported in the literature, and by word of mouth among alcoholics, regarding total relapses following one drink of alcohol (Taylor, 1953; Pfau, 1958; Dunn, 1965).

The results of this study support Fox (1955), Wallerstein (1957), and Hayman (1966), who reject the theory of an allergy or physical hypersensitivity to alcohol which sets off a craving for alcohol upon the ingestion of as little as one drink.

While the findings clearly support a psychological relation between one drink of alcohol and an increased desire for alcohol in the alcoholic, differences were not as significant as expected by the investigator.

The ethanol-induced loss of control concept in alcoholism is very prevalent among alcoholics. This is supported by the present study in which 36 out of 40 subjects reported that as little as one drink of alcohol ingested by an alcoholic sets off a strong, or un-controllable desire for more alcohol. It is true that the desire for alcohol increased significantly in those subjects who were told

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they had ingested alcohol, but the increase was not as great as
would be expected on the basis of the subjects' reported beliefs.
Presumably, a number of factors are involved, several of which were
suggested by the subjects in private interviews several days after
the testing experience. Subjects in groups C and D who had indi-
cated that one drink would set off a strong or uncontrollable desire
for more alcohol, yet who reported no desire on the treatment day
were interviewed. Two of the subjects stated that they were not
alcoholics, and therefore they would not be expected to have an
increased desire. It is believed that this response was an attempt
on their part to deny their problem with alcohol in a convincing
manner. These subjects had been directed to treatment by their
employers and family under threat of dismissal from employment.
They were alcoholics who were still in the "denial" stage of alco-
holism.

Other statements made by subjects in group C who believed one
drink of alcohol would set off a strong or uncontrollable urge or
desire for more alcohol include:

"I don't know why I didn't have a desire for alcohol.
I've always thought I would. It has happened to me before.
I can't understand why it didn't this time."

"Maybe it depends on the size of the drink."

"I guess it didn't happen because I didn't see the bottle--
maybe that has something to do with it."

"If I would have been over in the tavern, it would have
happened."

"I guess this (hospital) isn't the right place."

Three out of five of these statements allude to environmental
factors which could suggest a psychological influence for alcohol.

The hospital setting had eliminated most of the factors identified by the subjects as not being present. These are factors that would be in effect in most drinking situations outside the clinical setting. To the degree that these factors were not present, it could be expected to reduce the psychological effect of one drink of ethanol on the alcoholic's desire for ethanol.

Despite the absence of environmental factors, such as seeing the bottle, tasting the alcohol, and buying the drinks, ordinarily present, a psychological influence was significantly present. One subject in group D (placebo group) stalked into the investigator's office at 9:45 a.m. in a rage at his having been deliberately made to have an uncontrollable urge to drink. He stated that he couldn't say he was deceived because he had agreed to be in an experiment, but he didn't know this was going to happen. He was particularly incensed because his latest relapse into drinking had been occasioned by a drink of alcohol which he had unknowingly consumed at a party three weeks earlier. He stated that now, here at the hospital, he had the same uncontrollable urge.

The subject insisted that he would do anything for a drink at that point. When reminded that he knew he could have a drink for the asking, he refused to ask, stating that he was in the hospital to get off alcohol, not on it. The subject did request medication to help combat the urge to drink. The investigator listened to the subject for thirty minutes, permitting him to vent his feelings freely. The medication which was offered to the subject at 10:30 a.m.,
three and one half hours after the "treatment," was refused because the desire for a drink, by that time, had begun to ease up, according to the subject.

The experience of another subject in group D, though less traumatic, was significant. This subject reported that about 30 minutes after he had his drink of alcohol, he just seemed to relax and started to feel a strong desire for another drink. This desire lasted until about 11:00 a.m., when it started to dwindle and it was gone by noon.

It appears significant that not one subject appeared at the therapy room to request a drink. Each subject received a score of 0 on the behavioral test.

Subjects reporting a desire for alcohol were questioned regarding their failure to request a drink when they knew they could receive one for the asking. All subjects except one responded that the desire was not that strong, and since they were in the hospital, they did not want to ask for alcohol. All who indicated a desire for alcohol in groups C and D indicated that on the "outside" they would have gotten more alcohol to drink. A subject in group D said he wanted to ask for a drink, but thought he might have to stay in the hospital longer if he did.

The "vitamin mixture" served as a very effective concealant of alcohol. Only one subject in group B indicated a suspicion that there might have been something in that "drink this morning." The investigator and his assistant ignored the subject's statement and nothing more was said regarding it.
Personal interviews with subjects in groups C and D revealed that none questioned the alcoholic content of the mixture they had consumed. When informed that they had consumed alcohol, some stated "I thought so" or "I knew it." All subjects appeared to believe what they had been told.

In planning the study, one very important concern was that the subjects might talk with each other about the test and influence the effects of the instructions. One subject mentioned the experience to another patient apparently just casually. The subject, on his way back from the medication room remarked, jokingly, to another patient, that he had just had a "cocktail."

An interview with that subject at a later time revealed that at the time he made the remark he did not know that the drink was a part of the test. He had assumed it was part of the routine treatment for the day. Forty minutes later when the nurse read the instructions to him, which included the request that he not mention it to anyone, he responded by following the instructions carefully as given.

All subjects were serious and cooperative in relating to the experience. However, three patients, who might have been included in the study, had to be eliminated because of their physical condition. One of these subjects was in D. T's., one was hallucinating, and the third was experiencing shakes and tremors. One patient refused to participate in the study and two patients left the hospital before their fifth day.

The study revealed a vast difference between an alcoholic's reported belief regarding the one-drink loss of control concept in
alcoholism, and what he actually experienced. Factors cited earlier regarding the difference between the clinical and "real-life" setting could account for part of this difference. It may also be assumed that if there is in fact no physiological relation between one drink of alcohol and the alcoholic's desire for alcohol, that an experimental research study would tend to support this. Several of the subjects in group C expressed what appeared to be honest surprise and concern that they did not feel a stronger desire for alcohol. They had always believed this about themselves, yet in a controlled setting, designed to assess the phenomenon, they did not experience an increased desire for alcohol.

This study revealed no significant differences in belief of the ethanol-induced loss of control concept between alcoholics who were familiar with the A. A. philosophy and those who were not familiar with A. A. Prior to the study the investigator believed that A. A. oriented alcoholics held this view to a far greater extent than those unfamiliar with the A. A. philosophy.

The findings of this study, while supporting the assumption that the ethanol-induced loss of control concept is very commonly held among alcoholics, failed to support the view that this concept is significantly more common among A. A. oriented alcoholics than those not familiar with A. A.

The study revealed a negative correlation (-.10) between an alcoholic's age and self concept. The many factors influencing the alcoholic's self-esteem appear to have no chronological significance.
Implications for Education and Therapy

The implications for therapy resulting from this study are clear, yet tenuous. To propound that one drink of alcohol has no physiological effect upon the alcoholic's desire for further alcohol could pose a threat to untold numbers of people with the problem. The by-line and motto of many alcoholics is "avoid that first drink." For many alcoholics, avoidance of the first drink stands between them and self-destruction.

Conversely, the belief of a physiological influence of one drink of ethanol on an alcoholic's desire to drink, while serving as a sentinel to avoid problems with alcohol, may also serve as a barrier to prevent seeking more meaningful levels of adjustment. The allergy, x factor, and sensitization theories may serve as respectable ego defense mechanisms for some, and keep them from moving in a hurtful direction. Yet, at the same time, these theories may prevent others from moving in a more healthful direction.

It seems probable, that despite the lack of empirical validity supporting the ethanol-induced loss of control concept as a physiological phenomenon, the concept has made a significant contribution to the sobriety of many alcoholics.

This study found support for the theory that the effect of one drink on an alcoholic's desire for alcohol is psychological. However, it is possible that ethanol in greater amounts could have a physiological relation to the alcoholic's desire for alcohol.

The findings of this study should be used with discretion to
avoid placing a "stumbling block" before the alcoholic whose sobriety depends upon his belief in the one-drink loss of control concept.

The results may, however, serve as a "stepping stone" to a greater awareness and more optimal adjustment on the part of those alcoholics, who are motivated to move in this direction.

Decisions regarding the use of this data in a therapeutic setting must be made on an individual basis with the potential and well-being of the alcoholic as primary considerations.

The investigator discussed the findings of this study with alcoholics in the therapy program at the Battle Creek Sanitarium. The discussions provided an opportunity to help the alcoholic become aware that the loss of control experience takes place in his mind before it occurs in his body (Valles, 1969).

The alcoholic is encouraged to direct his attention to more relevant and meaningful areas of personal adjustment, including his thoughts and attitudes, style of living, interpersonal relationships, and other personal characteristics.

He is cautioned, however, against using this information as a means of prolonging denial of his problem with alcohol, or in attempting to prove that he can now safely drink alcohol. He is advised that to use this information in this way is to employ another mechanism for the denial of his problem, and is an attempt to avoid dealing with his problem in a constructive way.

Properly applied, the findings of this study may serve to motivate some alcoholics to move beyond a plateau of pathological fixation and its built-in demands for a life long program of structured
efforts to maintain a meaningful and rewarding sobriety.

Implications for Further Research

Having completed this research study, several areas are now apparent which could add depth to the findings, should the study ever be repeated. A replication of this study could provide opportunity for a validation of the findings. To strengthen a similar study, the researcher would recommend the following:

1. Subjects in groups C and D would not only be told they are consuming alcohol but "it" should be poured from an appropriate container into the mixture in their presence. This would provide a better opportunity for a psychological influence. The subjects would know at the time of ingestion that they had consumed alcohol, thus permitting a longer time span for the psychological influence to operate before they responded to the first questionnaire.

2. The behavioral test provided no measurement of differences within the subjects. The alcohol should be more readily available so the subject could get it without asking anyone. He should be able to get the alcohol at will without knowing he is being observed. This procedure would provide an experience closer to the type of reality which the subject experiences outside the clinical setting.

Additional research on this problem might consider using a greater amount of alcohol as an independent variable, while controlling for differences in physiological and psychological effects.

The study could be redesigned to investigate the relation of food (as an independent variable) to the desire for alcohol in alcoholics.

A study designed to identify and investigate various psychological influences and their strengths could provide a better understanding of those factors as they affect the alcoholic's desire to drink.
Conclusion

Insights gained by the investigator from this study are being applied in therapy as indicated on page 79. The findings of this research have provided strong support for encouraging the alcoholic to face relevant issues (psychological factors) in his search for a more rewarding life. Additional research into the problems associated with alcoholism will be conducted in an attempt to identify etiological factors in alcoholism as well as effective therapeutic methods for rehabilitation of the alcoholic.
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APPENDIX A

QUESTIONNAIRES ADMINISTERED TO SUBJECTS FOR MEASUREMENT OF THE DEPENDENT VARIABLE and SUBJECT CONSENT FORM
QUESTIONNAIRE I

Please put a check mark in the box behind the one statement in each group which best describes how you feel at the present time. Remember, that's how you feel right now.

Group I. Check one box only.

At the present time:

I feel an almost uncontrollable desire for food.
I feel a very strong desire for food.
I feel a slight desire for food.
I feel no desire for food.

Group II. Check one box only.

At the present time:

I feel an almost uncontrollable desire for a drink of beverage alcohol.
I feel a very strong desire for a drink of beverage alcohol.
I feel a slight desire for a drink of beverage alcohol.
I feel no desire for a drink of beverage alcohol.

Group III. Check one box only.

At the present time:

I feel extremely nervous and tense.
I feel very nervous and tense.
I feel slightly nervous and tense.
I do not feel nervous and tense.
QUESTIONNAIRE II

Please put a check mark in the box behind the one statement in each group which best describes how you have felt today. Remember, that's today only.

Group I. Check one box only.

Today I have felt an almost uncontrollable desire for food. □
Today I have felt a very strong desire for food. □
Today I have felt a slight desire for food. □
Today I have felt no desire for food. □

Group II. Check one box only.

Today I have felt an almost uncontrollable desire for a drink of beverage alcohol. □
Today I have felt a very strong desire for a drink of beverage alcohol. □
Today I have felt a slight desire for a drink of beverage alcohol. □
Today I have felt no desire for a drink of beverage alcohol. □

GROUP III. Check one box only.

Today I have felt extremely nervous and tense. □
Today I have felt very nervous and tense. □
Today I have felt slightly nervous and tense. □
Today I have not felt nervous and tense. □
QUESTIONNAIRE III

Please put a check mark behind the statement which you believe to be most nearly correct. Please mark only one statement in each of the three groups.

Group I. Check one box only.

Alcoholics, when not drinking, are:

- Always dependable. □
- Very dependable. □
- Seldom dependable. □
- Never dependable. □

Group II. Check one box only.

When an alcoholic consumes as little as one drink of beverage alcohol, it sets off:

- An almost uncontrollable desire for further alcohol consumption. □
- A very strong desire for further alcohol consumption. □
- A slight desire for further alcohol consumption. □
- No desire for further alcohol consumption. □

Group III. Check one box only.

Compared to the average social drinker, the alcoholic:

- Drinks very much more alcohol. □
- Drinks more alcohol. □
- Drinks about the same amount of alcohol. □
- Drinks less alcohol. □
QUESTIONNAIRE IV

Please put a check mark behind the statement which you believe to be most nearly correct. Mark only one of the three following statements.

I. I have never attended an Alcoholics Anonymous (A. A.) meeting in my life.

II. I have attended Alcoholics Anonymous (A. A.) meetings in my lifetime, but not more than five (5) meetings altogether.

III. I have attended Alcoholics Anonymous (A. A.) meetings during some period(s) of my lifetime and I'm sure I have attended more than five (5) of their meetings.

In a sentence or two tell the difference between OPEN and CLOSED Alcoholics Anonymous (A. A.) meetings.

________________________________________

________________________________________

________________________________________

________________________________________

Signature______________________________
SUBJECT CONSENT FORM

I hereby give my consent to participate in the Battle Creek Sanitarium Alcoholism Services Research Project. I understand that there will be no harm, pain or danger involved and the purpose of the research is to further knowledge about the cause and treatment of alcoholism.

(Signed)

(Signed)
BEHAVIORAL MEASURE

An assessment of the strength of desire for alcohol in subjects requesting a drink of alcohol at the therapy room.

The subject will inquire about the drink and the investigator will give the following responses as long as the subject insists upon his need for a drink or until the subject says no or agrees to point 4 on the behavioral test.

In any case, the subject will receive a drink and the investigator will indicate the subject's degree of persistence by the highest number (1, 2, 3, or 4) to which the subject was willing to agree.

All subjects who do not appear at the counseling room to request a drink will be given a score of zero--0 on the behavioral test.

Response number 1. You think you need a drink?

2. You don't really want a drink do you?

3. You're very sure that you want a drink right now?

4. There's no question about it, then, you do want a drink right now and you're willing to sign a statement saying you felt you had to have a drink of alcohol?
APPENDIX B

TABLE OF RAW SCORES

and

RANDOM ASSIGNMENT OF SUBJECTS
**TABLE OF RAW SCORES**

Key for Raw Score Tables

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<td>Loss of Control Belief</td>
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GROUP A

### Raw Scores

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GROUP B

### Raw Scores

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## Random Assignment of Subjects to Treatment Groups

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