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## The Relationship of Alcoholism Chronicity to the Specificity of Expectations for Reinforcement from Alcohol Use and Measures of Expectancy Change

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THE RELATIONSHIP OF ALCOHOLISM CHRONICITY TO THE SPECIFICITY OF  
EXPECTATIONS FOR REINFORCEMENT FROM ALCOHOL USE AND  
MEASURES OF EXPECTANCY CHANGE

by

Matthew M. Zarantonello

A Dissertation Submitted to the Faculty of the Graduate School  
of Loyola University of Chicago in Partial Fulfillment  
of the Requirements for the Degree of  
Doctor of Philosophy

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1983

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## VITA

The author, Matthew M. Zarantonello, was born on March 23, 1955 in Blue Island, Illinois. His elementary education was obtained at St. Joseph's in Homewood, Illinois, and his secondary education at Marian Catholic High School in Chicago Heights, Illinois.

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Zarantonello, M.M., Slaymaker, F., Johnson, J.E., and Petzel, T.P. The effects of anxiety and depression on anagram performance, ratings of cognitive interference, and the negative evaluation of performance. Journal of Clinical Psychology (In Press);

Zarantonello, M.M., Johnson, J.E., and Petzel, T.P. The effects of ego-involvement and task difficulty on actual and perceived performance of depressed college students. Journal of Clinical Psychology, 1979, 35, 285-288;

Bickman, L., and Zarantonello, M. The effects of deception and level of obedience on subjects' ratings of the Milgram study. Personality and Social Psychology Bulletin, 1979, 4, 81-85.

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## INTRODUCTION

It was not long after Rotter (1954) defined expectancy as "the probability held by the individual that a particular reinforcement will occur as a function of a specific behavior" (p. 107), that the notion was invoked as an explanatory concept central to the cognitive-behavioral dynamics of alcoholism. The earliest behavioral theories of alcoholism emphasized the role of anxiety as a "drive" in the context of a Hullian, negative reinforcement paradigm. For example, Conger (1956) speculated that the central reinforcement value of alcohol resided in its anxiety-reducing properties, and that such tension-reduction resulted in alcohol use becoming a learned coping response to many stressful, drive-arousing situations or stimuli. Physiological mechanisms related to alcohol's analgesic effects were then thought to mediate such tension reduction.

Researchers eventually realized the importance of cognitive factors, such as expectancy, in producing the behavioral effects of alcohol ingestion that were previously thought to be mediated exclusively through physiological processes. Cutter, Maloof, Kurtz, and Jones (1976) demonstrated that the alcoholic's expectations concerning the analgesic or tension-reducing effects of alcohol may play a large role in mediating these effects in the laboratory. Alcoholic subjects were found to report a reduction in their subjective experience of pain based upon their expectations of such an effect from drinking alcohol. Marlatt, Demming, and Reid (1973) showed that the loss of control over drinking, which has been previously



viewed in connection with alcohol's physiological addicting properties (Jellinek, 1960; MacLeod, 1955; Marconi, Poblete, Palestini, Moya, & Bahomondes, 1970), may be produced in the laboratory by the alcoholic's belief that he or she will be unable to control the amount of alcohol consumed once drinking begins. Ludwig, Wikler, and Stark (1974) showed a similar role for expectancy in the alcoholic's craving for a drink. In the case of sexual arousal, cognitive expectancy effects may even override the prevailing physiological response to alcohol in both social drinkers and alcoholics (Bridgel & Wilson, 1976; Lang, Searles, Lauerman, & Adesso, 1980; Wilson & Lawson, 1976a, 1976b).

Behaviorally-oriented theorists soon emphasized the general role of a cognitive expectancy factor in relation to the development of maladaptive drinking patterns and alcoholism, in addition to expectancy's role in mediating a single behavioral effect of alcohol ingestion (e.g., sexual arousal, analgesia, etc.). For example, Marlatt (1976) has formulated a cognitive-behavioral, negative reinforcement paradigm of alcoholism in which an individual's expectancies about the effectiveness of alcohol as an alternative coping response in situations perceived as stressful may increase the probability of drinking in such situations. According to this view, the alcoholic experiences very limited personal control and a lack of available social skills for coping with anxiety-arousing stimuli. Such a deficit in social skills heightens the alcoholic's feelings of powerlessness and ineffectuality in stressful circumstances, and further increases the probability of using alcohol as a coping device.

Donovan and O'Leary (1979) have further refined this view of alcoholism by distinguishing between the action-outcome expectancy originally promoted (Rotter, 1954) and the expectation of ineffective personal efficacy (Bandura, 1977), which the authors portrayed as more relevant to the alcoholic's experience of limited personal control. The former reflects the individual's belief that particular behaviors will lead to certain outcomes, while the latter relates to the individual's confidence that he or she can successfully execute the behavior required to produce the desired outcome. According to Donovan and O'Leary (1979), the alcoholic believes that alcohol consumption will result in the increased personal efficacy and control necessary to cope with aversive, anxiety-arousing situational stimuli. The anxiety- or tension-reducing effects of alcohol consumption may possibly reinforce the alcoholic's expectation of increased control and efficacy from drinking.

The relationship of cognitive expectancy factors to various alcohol consumption patterns and alcoholism chronicity has only recently become the focus of scientific investigation and empirical test. The findings of several studies suggest that expectations for reinforcement from alcohol use show a strong relationship to patterns of increased alcohol consumption. Battistich and Zucker (1980) found that subjects' expectations for positive experiences resulting from the use of various psychoactive substances was the single, most predictive factor of substance abuse within their sample. Subjects who placed predominant emphasis on the use of marijuana and alcohol

were found to expect a significantly greater percentage of positive experiences from their use of these substances than did subjects who placed predominant emphasis on the use of alcohol only. Within this latter group of subjects, those who tended toward more frequent use of alcohol expected a significantly greater percentage of positive experiences as a consequence of drinking than did subjects tending toward less frequent use of alcohol. The results of this study suggest a positive relationship between the generality of expectations for reinforcement from substance abuse and the severity of actual substance abuse, including abuse of alcohol.

Farber, Khavari, and Douglass (1980) classified the expectations for the consequences of alcohol consumption in their sample of 2,496 nonalcoholic subjects according to the degree to which these expectations reflected either positive- or negative-reinforcement contingencies. Expectations concerned with drinking as a "means toward certain social goals" were felt to reflect positive-reinforcement contingencies, while those expectations concerned with alcohol as a "means toward coping with unpleasant internal and/or external stimuli" were classified as reflecting negative reinforcement. Subjects whose expectations were classified as reflecting "high negative - high positive" (HNHP) or "high negative - low positive" (HNLP) reinforcement contingencies scored significantly and consistently higher on all indices of alcohol consumption than did subjects whose expectations for drinking reflected "low negative - high positive" (LNHP) or "low negative - low positive" (LNLP) reinforcement

contingencies. Analysis of the expectations of an independent sample of 133 alcoholics revealed that 93% of these subjects could be classified as either (HNHP) or (HNLP) drinkers.

The results of the Farber, et. al. (1980) study support the cognitive-behavioral theories of alcoholism mentioned earlier (Donovan & O'Leary, 1979; Marlatt, 1976) through the demonstrated prominence of expectations for negative reinforcement in the alcoholic's expectancy structure. However, no data are offered regarding the specific kinds of negative reinforcement expected by heavy drinkers and alcoholics. Do individuals who tend to abuse alcohol expect drinking to reduce the impact of aversive stimuli associated with aggressive situations or impulses, sexual situations or impulses, or situations warranting an assertive response? Is there any consistency or reliability to the quality of negative reinforcements expected by alcoholics as a consequence of their drinking?

Research more directly addressed to these questions has been conducted by Brown, Goldman, Inn, and Anderson (1980) who have attempted to define the domain of expectations for reinforcement from alcohol use through the development of the Alcohol Expectancy Questionnaire (AEQ). Factor analysis of the AEQ data from the responses of 440 Wayne State University students produced six dimensions along which subjects' expectations for reinforcement from their alcohol use could be classified. The six factors were: (1) alcohol as a global, positive transforming agent; (2) alcohol for enhancement of sexual experiences and performance; (3) alcohol to enhance both social and physical pleasure; (4) al-

cohol for increased arousal with facets of power and aggression; (5) alcohol for increased social assertiveness; and, (6) a relaxation/ tension-reduction dimension. College students with longer exposure to alcohol and heavier consumption patterns were found to report expectations for sexual enhancement and power-aggression. Students with less exposure to alcohol and limited consumption patterns reported more general expectancies along all six dimensions, with particular emphasis on the broadest factor, alcohol as a global transforming agent.

These results suggest that heavier alcohol consumption and increased alcoholism chronicity are associated with expectations that alcohol consumption will reduce the impact of aversive stimuli associated with sexual and aggressive impulses and/or situations. The results of the Brown, et. al. (1980) study also suggest that expectations for reinforcement from drinking become more specific as alcoholism chronicity increases. Such an interpretation is inconsistent with previously cited research (Battistich and Zucker, 1980) suggesting a positive relationship between the generality of expectations for reinforcement from substance abuse and the extent or severity of actual substance abuse, including alcohol consumption. It is possible that the findings of the Brown, et. al. (1980) study were specific to the college student sample examined, which consisted of "social drinkers" (p. 420) characterized by moderate levels of alcohol consumption. How generalizable are the results of the Brown, et. al. (1980) study to the alcoholic population? Do

inpatients being treated for alcohol abuse demonstrate specific or more general and diffuse expectations for reinforcement from drinking when compared to nonalcoholic inpatients?

One purpose of the present investigation is to examine the relationship of various indices of alcoholism chronicity and expectations for reinforcement from drinking in such a clinical sample. It is hypothesized that canonical correlation of inpatients' AEQ factor scores and measures of alcohol intake and drinking history will result in two significant canonical relationships extracted from the data. One significant canonical variate will associate increased alcohol consumption and chronicity with higher scores on specific expectancy factors concerning increased aggressive arousal and sexual enhancement. A second significant canonical variate will associate reduced alcohol consumption and chronicity with more global and diffuse expectations for reinforcement along all six AEQ factors, with particular emphasis on the most general factor, alcohol as a global transforming agent. It is further hypothesized that inpatients being treated for alcohol abuse can be successfully discriminated from general medical inpatients on the basis of their AEQ factor scores for expectations of increased aggressive arousal and enhanced sexual experience as a consequence of drinking.

Such findings would add support to the contention that expectations for reinforcement from drinking become more specific as alcoholism chronicity increases. These hypotheses are also consistent

with a postulated negative relationship between the generality of expectations for reinforcement from drinking and the severity of alcohol abuse.

The theoretical role of anxiety can be clearly discerned in both the tension-reduction model (Conger, 1956) and the cognitive social-learning approach to alcoholism (Donovan & O'Lear, 1979; Marlatt, 1976). Both theories postulate that the alcoholic drinks to reduce the impact of anxiety-arousing, aversive stimuli.

Theoreticians and researchers have also speculated about the significance of depression as an affective component associated with alcoholism chronicity. Pitts and Winokur (1966) found that suicide was a more frequent cause of death in alcoholism and depressive disorder than in any other category of psychiatric or general medical illness. These authors have highlighted the difficulty in determining whether depression is symptomatic of alcoholism, or whether alcoholism is symptomatic of depression. Weingold, Lachin, Bell, and Coxe (1968) found that a significant majority of their alcoholic sample exhibited mild to deep depression on the Zung (1965) scale, but only a small percentage of this sample received antidepressant treatment. The authors speculated that among alcoholics when mild depression is accompanied by overt anxiety, anxiety is the symptom most often treated. In a more recent study, Gibson and Becker (1973) factor-analyzed the responses of alcoholic patients to the Beck Depression Inventory (BDI) and the Zung scale, which revealed similarities to the factor structure of self-reported,

pathological depression. Both factor structures appeared associated with affective responses reflecting self-debasement, vital depression, and to a lesser extent pessimism suicide.

The similarity between the previously mentioned cognitive social-learning orientation to alcoholism and Abramson, Seligman, and Teasdale's (1978) revision of the learned helplessness theory of depression has also been highlighted (Donovan & O'Leary, 1979). Both theories emphasize a central role for perceived and experienced inability to control the outcome of stressful events. Research investigating the relationship of control orientation, learned helplessness, and depression in alcoholic samples has been rare and generally inconsistent. O'Leary, Donovan, Cysewski, and Chaney (1977) found no significant relationship between (I-E) perceived locus of control (Rotter, 1966) and questionnaire measures of depression in a sample of alcoholic inpatients. However, a significant relationship between experienced control (E-C) (Tiffany, 1967) and scores on the BDI and MMPI-D scale was revealed in the same sample. Alcoholic inpatients who experienced little control (low E-C) had significantly higher scores on both measures of depression than did alcoholics who experienced higher degrees of control (high E-C). Significant interactions were also found between perceived and experienced control on both of the depression scales. Alcoholic inpatients who perceived an external locus of control and experienced little control had significantly higher scores on both the BDI and MMPI-D scale than any of the other three classifications of control orientation among alcoholic inpatients. The



authors speculated that within the alcoholic population, the less generalized control one experiences oneself to have over stressful events the more depressed one appears to be.

O'Leary, Donovan, Krueger, and Cysewski (1978) examined the relationship between perception of noncontingency between response and reinforcement and depression in a sample of male veterans participating in an inpatient alcoholism rehabilitation program. Control orientation and perception of noncontingency was assessed through expectancy change measures identical to those described by Miller and Seligman (1973). Alcoholics of all levels of depression were found to display significantly higher levels of appropriate, outcome-dependent expectancy change on the skill task as compared with the chance task. No significant Depression X Task interactions in expectancy change were found, as in previous investigations of learned helplessness (Miller & Seligman, 1973). However, correlational analysis indicated a significant relationship between level of depression and the initial ( $r = -.28$ ) and end expectancy statements ( $r = -.25$ ) derived from the skill task, while no significant correlations were obtained between level of depression and expectancy change measures on the chance task. It was concluded that salience of task characteristics, rather than level of depression, accounted for a larger proportion of variance in expectancy change measures. The authors speculated that the combined effects of alcoholism and depression may introduce a confounding variable that would make expectancy change statements on a skill task differ from those of clinically depressed nonalcoholics.

The results of the O'Leary, et. al. (1978) study may therefore suggest that the interaction of alcoholism and depression may alter the relationship between the perception of noncontingency and depression in alcoholic samples, at least as far as expectancy change measures derived from a skill task are concerned. A second purpose of the present investigation is to determine whether the perception of noncontingency between response and reinforcement is significantly related to indices of increased alcoholism chronicity and alcohol intake, rather than depression, in a sample of inpatients being treated for alcohol abuse and general medical inpatients. It is hypothesized that canonical correlation of expectancy change measures derived from a skill task and indices of alcoholism chronicity will result in two significant relationships being extracted from the data. One significant canonical variate will associate less outcome-dependent expectancy change with increased alcoholism chronicity and alcohol intake. A second significant canonical variate will associate greater outcome-dependent expectancy change with reduced alcoholism chronicity and alcohol intake. It is further hypothesized that inpatients being treated for alcohol abuse can be significantly discriminated from general medical inpatients on the basis of expectancy change measures derived from a skill task. It is hypothesized that alcoholic inpatients will demonstrate a lower total shift in expectancy from Trial 1 to Trial 3, following two successful outcomes, a lower total value of appropriate expectancy shifts across 10 trials, and a higher total value of inappropriate shifts across trials than will nonalcoholic inpatients.

Such findings would provide an explanation for the lack of significant differences in expectancy change measures derived from within-group comparisons among alcoholics of varying levels of depression, and would support the contention that the interaction of alcoholism and depression changes the relationship between the perception of noncontingency and depression in such a sample.

On a more general level, a related question for research is whether measures of depression and anxiety show a relationship with increased alcohol consumption and alcoholism chronicity? It is hypothesized that inpatients being treated for alcohol abuse can be significantly discriminated from general medical inpatients on the basis of scores reflecting both anxiety and depression. Canonical correlation of depression and anxiety scores with indices of alcohol intake and alcoholism chronicity is hypothesized to result in one significant relationship being extracted from the data. This significant canonical variate will associate higher depression and anxiety scores with increased alcohol intake and alcoholism chronicity. Such hypotheses are consistent with previously cited theory and research emphasizing the relationship between these affective components and alcoholism (Conger, 1956; Donovan & O'Leary, 1979; Gibson & Becker, 1973; Marlatt, 1976).

The concept of expectancy may also have important practical implications for the treatment of alcoholism. For example, Marlatt (1979) stated that one critical aspect of any alcoholism treatment program is the provision of information about the long-range effects on physical

health and social well-being of alcohol use, in order to counter the tendency to think only of the initial pleasant short-term effects of alcohol use. Research has shown that alcoholics tend to project unrealistic expectations about their deaths in that they expect to live a longer life than that indicated by U.S. Bureau of Census data, and they only infrequently attribute the projected cause of their deaths to drinking (Lowe & Thomas, 1977). What is the relative strength or intensity of expectations for punishment in the expectancy structure of alcoholics and nonalcoholics? What effect does alcoholism rehabilitation have on the expectations for punishment from alcohol use reported by inpatients?

A final purpose of the present investigation is to compare the intensity of expectations for punishment from drinking reported by alcoholic and nonalcoholic inpatients, and to attempt to evaluate the impact of inpatient alcoholism rehabilitation on the expectations for punishment reported by alcoholics. It is hypothesized that inpatients recently admitted for alcoholism rehabilitation will display a significantly lower expectation for punishment from alcohol use than general medical inpatients. It is further hypothesized that inpatients completing the course of alcoholism rehabilitation will display a significantly greater expectation for punishment from alcohol use when compared to their pretreatment levels. These hypotheses are consistent with previous research (Lowe & Thomas, 1977) and the educative effort directed toward patients by many alcoholism treatment teams from different disciplines, in the form of seminars or various therapeutic

modalities devoted to the clarification of misconceptions concerning the physical and social consequences of abusing alcohol.

In sum, it is hypothesized that canonical correlation of inpatients' AEQ factor scores and measures of alcohol intake and drinking history will result in two significant canonical relationships extracted from the data. One significant canonical variate will associate increased alcohol consumption and chronicity with high scores on specific expectancy factors concerning increased aggressive arousal and sexual enhancement. A second significant canonical variate will associate reduced alcohol consumption and chronicity with more global and diffuse expectations for reinforcement along all six AEQ factors, with particular emphasis on the most general factor, alcohol as a global transforming agent. It is further hypothesized that inpatients being treated for alcohol abuse can be successfully discriminated from general medical inpatients on the basis of their AEQ factor scores for expectations of increased aggressive arousal and enhanced sexual experience as a consequence of drinking.

It is also hypothesized that canonical correlation of expectancy change measures derived from a skill task and indices of alcoholism chronicity will result in two significant relationships being extracted from the data. One significant canonical variate will associate less outcome-dependent expectancy change with increased alcoholism chronicity and alcohol intake. A second significant canonical variate will associate greater outcome-dependent expectancy change with reduced alcoholism chronicity and alcohol intake. It is further hypothesized that inpatients being treated for alcohol abuse can be significantly discriminated from general medical

inpatients on the basis of expectancy change measures derived from a skill task. It is hypothesized that alcoholic inpatients will demonstrate a lower total shift in expectancy from Trial 1 to Trial 3, following two successful outcomes, a lower total value of appropriate expectancy shifts across 10 trials, and a higher total value of inappropriate shifts across trials than will nonalcoholic inpatients.

It is also hypothesized that inpatients being treated for alcohol abuse can be significantly discriminated from general medical inpatients on the basis of scores reflecting both anxiety and depression. Canonical correlation of depression and anxiety scores with indices of alcohol intake and alcoholism chronicity is hypothesized to result in one significant relationship being extracted from the data. This significant canonical variate will associate higher depression and anxiety scores with increased alcohol intake and alcoholism chronicity.

It is also hypothesized that inpatients recently admitted for alcoholism rehabilitation will display a significantly lower expectation for punishment from alcohol use than general medical inpatients. It is further hypothesized that inpatients completing the course of alcoholism rehabilitation will display a significantly greater expectation for punishment from alcohol use when compared to their pretreatment levels.

## METHOD

### Subjects

Sixty male inpatients from Hines Veterans Administration Hospital in Hines, Illinois served as subjects in the present study. All subjects who participated in the study were judged to be oriented and without evidence of gross psychiatric or neurological disturbance on the basis of medical records and an informal mental status assessment at the time of participation in the study. Thirty-three consecutive admissions to the four-week, inpatient rehabilitation program of the Alcoholism Treatment and Educational Center (ATEC) at Hines VAH served as the alcoholic sample for the present investigation. The ATEC rehabilitation program at Hines VAH is generally geared toward total abstinence from alcohol as a goal for its participants, utilizing various therapeutic and didactic group modalities in accordance with the theory of Alcoholics' Anonymous as a treatment approach.

Three alcoholic subjects from the ATEC sample (9.1%) were eliminated from the study due to reading difficulties ( $n = 2$ ) or premature discharge from the four-week, rehabilitation program due to drinking ( $n = 1$ ). The remaining thirty alcoholic subjects included in the data analysis initially participated in the study an average of 12.20 days after being admitted to the hospital for detoxification, and an average of 2.33 days after being admitted to the four-week, rehabilitation program. Follow-up measures were taken an average

of 18.57 days following the initial data collection from alcoholic subjects. The average age of alcoholic subjects from the ATEC sample was 39.53 years (S.D. = 12.07). The racial/ethnic composition of the ATEC sample was as follows: 56.67% White (n = 17); 33.33% Black (n = 10); 6.67% Hispanic (n = 2); and 3.33% American Indian (n = 1).

Thirty-five consecutive inpatient admissions to general surgical, orthopedic, and podiatry wards at Hines VAH served as the nonalcoholic, control group in the present investigation. Five subjects (14.29%) were eliminated from the control group when review of medical records indicated a previous history of alcoholism or treatment for alcohol abuse. The remaining thirty control subjects participated in the study immediately following admission to the hospital (n = 15) or on a post-operative basis (n = 15) if surgical intervention requiring general anesthesia was to be performed. Nonalcoholic inpatients participated in the study an average of 13.30 days following their admission to the hospital. Fifty-seven percent (n = 17) of the nonalcoholic inpatients were admitted to the general surgical ward of Hines VAH, while 33% (n = 10) were admitted for orthopedic concerns, and 10% (n = 3) for medical treatment in podiatry. The average age of subjects participating in the nonalcoholic, control group was 45.60 years (S.D. = 12.46). The racial/ethnic composition of this control sample was as follows: 80.00% White (n = 24); 13.33% Black (n = 4); and, 6.67% Hispanic (n = 2).



## Materials

A brief Data Sheet (DS) was used to assess demographic information. The DS (see Appendix A) also consisted of eight items, each rated on a ten-point scale, that assessed subjects' expectations for punishment or aversive consequence from alcohol use. The item content was chosen to reflect the increased risk to physical health and social well-being cited by various authors and researchers in relation to chronic alcohol abuse (Coleman, 1976; Lowe & Thomas, 1977; U.S. Department of Health, Education, and Welfare, 1974). Subjects' responses to these eight items of the DS were averaged to form a "Physical Punishment Expectancy Index" (PPEI), a "Social Punishment Expectancy Index" (SPEI), and a "Total Punishment Expectancy Index" (TPEI).

Questionnaire measures were used to assess subjects' level of depression, anxiety, and the extent of expectations for reinforcement from alcohol use. The Beck Depression Inventory (BDI) and the State-Trait Anxiety Inventory (STAI) were used to assess the relationship of these affective components to indices of alcoholism chronicity and alcohol intake. The Alcohol Expectancy Questionnaire (AEQ) (see Appendix B) was designed to assess the reinforcing properties of alcohol use expected by subjects (Brown, et. al., 1980). The AEQ consists of ninety items to which subjects respond either "agree" or "disagree".

A four-letter anagram task was used to assess control orientation and the perception of noncontingency between response and reinforcement, as defined through expectancy change measures derived from a skill task.

In order to insure that all subjects would be exposed to the same 50% reinforcement schedule, the stimulus words to be used as anagrams were selected on the basis of pilot testing at Hines VAH and their frequency of occurrence in the Corpus, a body of 1,014,232 words of natural-language text (Kucera & Francis, 1967). Five relatively common stimulus words with a mean frequency of occurrence of 393.80 were chosen to serve as anagrams on "success" trials of the task. These anagrams were arranged to promote easy solution through the simple transposition of one letter for a correct response (HADN becomes HAND; HAED becomes HEAD). Five uncommon stimulus words with a mean frequency of occurrence of 1.00 were selected to serve as anagrams on "failure" trials of the task. These anagrams were not arranged according to any pattern that would promote easy solution. The anagrams were printed on 3 X 5 cards and were presented individually to each subject. The anagrams used in the present research and their order of presentation was as follows: HADN; HAED; TIAO; RAUE; EEDN; OOMR; LWYA; CIOF; ACEF; and, GIAM.

Selected questions from Marlatt's (1976) Drinking Profile (DP) were used in a structured interview format to assess information pertaining to subjects' alcohol consumption patterns and drinking history. Those questions selected from the DP for use will be detailed in the Procedure section of the manuscript. The Alcohol-Related Life Problems Scale (see Appendix C) provided a measure of subjects' life problems associated with alcohol use (MAST score), as well as a measure of the extent of subjects' physiological addiction to ethanol (Ph score).

A questionnaire developed by the investigator assessed subjects' self-reported alcohol intake (see Appendix D) for a "typical drinking day". Subjects were also asked to specify the frequency of occurrence of such typical drinking days so that an assessment of alcohol intake on a monthly basis could be made. Miller's (Note 1) conversion manual was used to convert subjects' self-reported alcohol intake into Standard Ethanol Consumption Units (SEC), a measure based upon the number of ounces and percent alcohol content of the particular alcoholic beverages ingested. One SEC unit is equivalent to one-half ounce of pure ethyl alcohol.

#### Procedure

Each subject was given a consent form describing the research as an examination of "how people expect alcohol to affect their physical and psychological well-being, and to additionally determine if these expectations are related to particular drinking patterns." After agreeing to participate in the study the Alcohol Expectancy Questionnaire (AEQ), the Data Sheet (DS), the Beck Depression Inventory (BDI), and the State-Trait Anxiety Inventory (STAI) were administered in that order to each subject.

Following completion of the above, each subject's self-report of alcohol intake was assessed using the questionnaire developed by the investigator. After reading the instructions, each subject was asked to record the brand names and/or proofs of the alcoholic beverages "you usually drink in a day when you're drinking". Each subject was then asked to record the amount of each alcoholic beverage consumed in a

"typical drinking day" using some standard unit of measure (e.g., ounces, pints, quarts, etc). If a given subject reported more than one possible combination of alcoholic beverages (e.g., whiskey and beer, vodka and wine), that subject was asked to make a judgment and record the combination of beverages felt to be "most likely". If the subject was unable to make such a judgment, all possible combinations of alcoholic beverages were recorded, and the combination representing the largest intake of ethanol in terms of SEC units was included in the data analysis as that subject's "Typical Day SEC Score". Each subject was then asked to use the second page of the questionnaire to record the frequency of the previously indicated typical drinking days, so that a "Monthly SEC Score" could be computed on the basis of a twenty-eight day period (i.e., four weeks per month). If a given subject requested some reference period to record the frequency of typical drinking days, that subject was asked to "record the frequency of typical drinking days in the month before you were admitted to the hospital".

Each subject was then administered a structured interview using several items adapted from the DP to obtain additional indices of drinking history and alcoholism chronicity. The subject was asked: (1) How old were you when you first took one or more drinks?; (2) How old were you when you first became intoxicated?; (3) Tell me about a day when you drank more than you normally do. What did you drink in that day and how much? (Subjects were asked to specify brand names and/or proofs so that a "Personal Record SEC Score" could be computed); (4) What is the

longest period of continuous drinking you've ever had, in hours, without sleep?; and, (5) What is the longest period of time, in consecutive days, that you have ever gone without taking a drink during the past year? Each subject was then administered a series of yes-no questions which constituted the Alcohol-Related Life Problems Scale of the DP. The subject was assigned a MAST score and a Ph score on the basis of his responses to these yes-no questions.

Following completion of the structured interview the four-letter anagram task was used to evaluate expectancy change and the perception of noncontingency through an assessment of each subject's probability of success estimates. The following instructions were used to introduce the anagram task as a measure of "ability" or skill:

"Now I'd like to see how well you perform on a task designed to measure your verbal ability. In short, the test you are about to take will measure your knowledge of words. I have ten of these 3 by 5 cards here, and on each of these cards there is an anagram or scrambled word. I am going to show you these cards one at a time, and I'd like you to unscramble each of these ten scrambled words as quickly as you can, within the given time period. As previously mentioned, this test will measure your verbal ability or knowledge of words. Are there any questions."

Each subject was asked to estimate his probability of success before presentation of every anagram, using a scale that ranged from zero (certain failure) to ten (certain success). Similar probability of success estimates have been used to study the perception of noncontingency between response and reinforcement in previous research on learned helplessness (Miller & Seligman, 1973; O'Leary et. al., 1978).

After each subject asked any questions about the task and it was determined that the task requirements were understood, the following instructions for estimating the probability of success on the anagram task were read:

"Before I present you with each anagram, I would like you to estimate how certain you are that you can unscramble the anagram correctly. I would like you to estimate your degree of certainty of success on a scale going from 0 to 10. For example, if you feel fairly certain that you will unscramble the anagram correctly, you may rate yourself with a high number such as a nine or a ten. If you feel moderately sure that you will unscramble the anagram correctly you may rate yourself with a number near the center of the scale, such as a four, five, or six. If you feel pretty sure that you will not be able to unscramble the anagram correctly you may rate yourself with a low number, such as a zero or a one. You may use any number on the scale from 0 to 10. It is important that you select your estimates carefully and that they correspond closely with how certain you really are. They should be an accurate description of the degree to which you really feel that you will or will not succeed. Are there any questions?"

"Now, before we begin make an estimation on the zero to ten scale as to what you think your likelihood is of unscrambling the first anagram correctly."

Probability of success estimates were then obtained before each of the ten anagram trials. Each subject was allowed ten seconds to unscramble the anagram on a given trial. If a given subject was unsuccessful in unscrambling an anagram on a "success" trial, or was successful in unscrambling an anagram on a "failure" trial, he was allowed to complete the anagram task but the data derived was eliminated from the statistical analysis. No data were eliminated from the statistical analysis under these conditions. Feedback concerning success and failure was conveyed through a tally sheet placed directly in front of the

subject, on which the examiner recorded the subject's response to a given anagram trial as either "correct" or "incorrect". Following administration of the ten anagram trials, each subject was debriefed and given a rationale for the procedures used. This was followed by a discussion period in which the subject was encouraged to ask any questions about the research.

Each subject from the ATEC sample was then told they would be contacted in approximately three weeks so that several follow-up measures could be obtained. The DS and the questionnaire used to assess each subject's self-reported, alcohol intake were readministered at that time, approximately one week prior to each subject's completion of the four-week, rehabilitation program.

## RESULTS

### Data Structure

The statistical design for the present investigation was primarily multivariate in nature, and utilized the chi-square test of Wilks' Lambda and approximation to the multivariate distribution. The following six factor scores from the AEQ were computed for each subject using the factors and unit weight scoring system developed in previous research (Brown et. al., 1980): (1) alcohol as a global, positive transforming agent; (2) alcohol for enhancement of sexual experience and performance; (3) alcohol to enhance both social and physical pleasure; (4) alcohol for positive and socially assertive personality changes; (5) alcohol for relaxation and tension reduction; and, (6) alcohol for feelings of arousal and aggression. Nine alcoholism chronicity and drinking pattern variables derived from the structured interview were computed for each subject. These variables were: (1) Typical Day SEC Score; (2) Monthly SEC Score; (3) age at which the subject first took one or more drinks; (4) age when first intoxicated; (5) Personal Record SEC Score; (6) longest period of continuous abstinence during the past year (in days); (7) longest period of continuous drinking (in hours); (8) Ph score; and, (9) MAST score.

Five expectancy change measures derived from the anagram task were computed for each subject. These expectancy change measures were identical to those used in previous research on learned helplessness



(Miller & Seligman, 1973). These expectancy change measures were: (1) the initial expectancy statement prior to the first anagram trial; (2) the total shift in expectancy from Trial 1 to Trial 3, following two successful outcomes; (3) the total value of appropriate expectancy shifts across 10 trials, consisting of the absolute values of increases in expectancies following success and decreases following failure; (4) the total value of inappropriate shifts across trials, consisting of the absolute values of increases in expectancies following negative outcomes and decreases following positive outcomes; and, (5) the end expectancy statement following equal exposure to both positive and negative outcomes.

#### Reliability of Self-Reported Alcohol Intake

The self-reports of alcohol intake obtained from alcoholic inpatients during the initial data collection and at follow-up were analyzed by means of the Pearson Correlational Analysis in order to determine the temporal consistency of these measures. Typical Day SEC Scores recorded during the initial data collection were found to correlate highly with the Typical Day SEC Scores obtained from alcoholic inpatients' self-reports approximately three weeks later ( $r_{(30)} = .82, p < .001$ ). Monthly SEC Scores computed from alcoholic inpatients' self-reports at the time of the initial data collection and follow-up showed a similarly high degree of relationship ( $r_{(30)} = .87, p < .001$ ). The magnitude of these correlation

coefficients suggest that the self-reported alcohol intake of alcoholic inpatients was highly reliable, demonstrating little change over time between the initial data collection and follow-up.

The validity of alcoholic inpatients' self-reports of alcohol intake was not directly assessed in the present study. The high degree of temporal consistency demonstrated in alcoholic inpatients' retrospective self-reports fulfills an important prerequisite for their validity, however, since the validity of such a measure is constrained or dependent upon its reliability over time (Cronbach, 1970). Previous research has also demonstrated that most types of self-reports of alcohol intake tend to be valid and unbiased (Polich, 1982).

#### Expectations for Reinforcement from Drinking and Alcoholism Chronicity

In order to assess the relationship of measures of alcoholism chronicity and expectations for reinforcement from drinking, the correlation matrix consisting of the six AEQ expectancy factor scores and the nine alcoholism chronicity and drinking history variables was subjected to canonical correlation analysis. The results of this canonical correlation analysis are summarized in Table 1. It was hypothesized that two significant canonical relationships would result from such an analysis. Inspection of the table reveals that this hypothesis was not confirmed. One significant relationship between AEQ factor scores and indices of alcoholism chronicity was extracted using the canonical analysis,  $\chi^2(54) = 113.70$ ,  $p < .001$ , which accounted for approximately 76% of the variance

Table 1

Canonical Correlation of AEQ Factor Scores and  
Alcoholism Chronicity and Drinking History Variables

Number	Eigenvalue	Canonical Correlation	Chi-Square	df	Significance
1	0.75654	0.86979	113.70351	54	0.000
2	0.24476	0.49473	41.65112	40	0.399
3	0.23929	0.48917	27.33458	28	0.500
4	0.11590	0.34044	13.38603	18	0.768
5	0.10824	0.32899	7.10350	10	0.716
6.	0.02443	0.15629	1.26123	4	0.868

shared by the two sets of variables. The canonical coefficients for each variable in both sets are shown in Table 2. Inspection of this table indicates that this significant canonical variate tended to associate higher MAST scores from the DP with higher scores on AEQ Factor 1. Brown, et. al. (1980) labelled AEQ Factor 1 as the broadest expectancy factor representing expectations that "alcohol acts as a positive, global transforming agent" (pp. 422 & 423). AEQ Factor 1 is the most general factor, containing the greatest number of expectancy items of any other factor on the AEQ. The results of the canonical correlation analysis therefore indicate that greater severity of life-problems resulting from alcohol consumption is associated with more general and global expectations for reinforcement from drinking.

It was also hypothesized that inpatients being treated for alcohol abuse would be significantly discriminated from general medical inpatients on the basis of their AEQ factor scores for expectations of increased aggressive arousal and enhanced sexual experience as a consequence of drinking. Stepwise discriminant analysis using the Wilks' Lambda selection criterion was performed in an effort to test this hypothesis. The results of this discriminant analysis are reported in Table 3. The discriminant analysis produced a significant canonical discriminant function,  $X^2_{(2)} = 57.33$ ,  $p < .001$ , by which 86.67% of the alcoholic and nonalcoholic inpatients could be correctly classified. This significant canonical discriminant function included scores on AEQ Factor 1 and AEQ Factor 2 as the only discriminating variables. Brown, et. al. (1980) labelled AEQ Factor 2 as an "enhanced sexual experience

Table 2

Canonical Coefficients for AEQ Factor Scores and Alcoholism Chronicity and  
Drinking History Variables

Coefficients for Canonical Variables of the First Set

Typical Day SEC Score	0.16065
Monthly SEC Score	0.02994
Personal Record SEC Score	-0.17680
Age of First Drink	0.20445
Age of First Intoxication	-0.17877
Consecutive Hours of Drinking	0.10931
Consecutive Days of Abstinence	-0.02004
MAST Score	0.79384
Ph Score	0.09556

Coefficients for Canonical Variables of the Second Set

AEQ Factor 1	0.78401
AEQ Factor 2	-0.13711
AEQ Factor 3	-0.02122
AEQ Factor 4	0.13234
AEQ Factor 5	0.23495
AEQ Factor 6	0.01877

Table 3

Stepwise Discriminant Analysis Using AEQ Factor Scores  
As Discriminating Variables

<u>Eigenvalue</u>	<u>Percent of Variance</u>	<u>Canonical Correlation</u>	<u>Chi-Squared</u>	<u>df</u>	<u>Significance</u>
1.73415	100.00	0.7964015	57.332	2	0.0000

and performance dimension" (p. 423). Pooled within-groups correlations between the significant canonical discriminant function and AEQ factor scores were computed in order to determine the independent contribution of scores on each AEQ factor to the discrimination of alcoholic and non-alcoholic inpatients. The results of this analysis are reported in Table 4. Inspection of this table reveals that scores on AEQ Factor 1 made the largest independent contribution to the discrimination of alcoholic and nonalcoholic inpatients, while scores on AEQ Factor 2 made the smallest independent contribution. The finding that AEQ Factor 2 was one of two variables entered into the significant canonical discriminant function, while making the smallest independent contribution to that function, most likely indicates that factor scores on the AEQ were not orthogonal in the present subject sample.

Individual t-tests were then performed to probe differences in AEQ factor scores for alcoholic and nonalcoholic inpatients. The results of this analysis are summarized in Table 5. Inspection of the table reveals that all of the six AEQ factors discriminated between alcoholic and nonalcoholic inpatients. Alcoholic inpatients obtained significantly higher mean scores on all six AEQ factors than did non-alcoholic inpatients. The results of the discriminant and canonical correlation analysis suggest that a higher level of general and widespread expectations for reinforcement from drinking is associated with increased alcoholism chronicity.

Table 4

Pooled Within-Groups Correlations Between Canonical Discriminant Function  
And AEQ Factor Scores

AEQ 1	0.93347
AEQ 2	0.36184
AEQ 3	0.51500
AEQ 4	0.71727
AEQ 5	0.52428
AEQ 6	0.46782

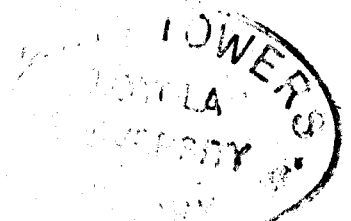




Table 5

Mean AEQ Factor Scores Between Groups (n = 30)

<u>Variable</u>	<u>Alcoholics</u>		<u>Nonalcoholics</u>		<u>df</u>	<u>t-Value</u>
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>		
AEQ 1	45.17	5.972	32.10	4.773	58	9.36***
AEQ 2	10.20	2.552	8.07	1.964	58	3.63**
AEQ 3	16.13	1.358	13.90	2.468	45.08*	4.34***
AEQ 4	20.07	2.463	14.47	3.411	58	7.29***
AEQ 5	16.07	1.818	12.33	2.832	49.43*	6.08***
AEQ 6	8.23	1.478	6.73	1.552	58	3.83***

\*Separate Variance Estimates

\*\*p = .001

\*\*\*p < .001

### Perception of Noncontingency and Alcoholism Chronicity

The correlation matrix consisting of the five expectancy change measures derived from the anagram task and the nine alcoholism chronicity and drinking history variables was subjected to canonical correlation analysis in order to determine whether the perception of noncontingency between response and reinforcement is significantly related to indices of increased alcoholism chronicity and alcohol intake. The results of this canonical analysis are summarized in Table 6. It was hypothesized that less outcome-dependent expectancy change would be significantly related to increased alcoholism chronicity and alcohol intake. Inspection of Table 6 reveals that this hypothesis was not confirmed. Canonical correlation analysis extracted no significant relationships between measures of expectancy change and indices of alcoholism chronicity.

It was also hypothesized that inpatients being treated for alcohol abuse can be significantly discriminated from nonalcoholic inpatients on the basis of expectancy change measures derived from the anagram task. Stepwise discriminant analysis using the Wilks' Lambda selection criterion was performed in an attempt to test this hypothesis. The results of this discriminant analysis are displayed in Table 7. Inspection of the table reveals that no significant canonical discriminant functions were obtained in this analysis. The results of the discriminant and canonical correlation analyses do not support the hypothesized relationship between the perception of noncontingency between response and reinforcement and indices of alcoholism chronicity.

Table 6

Canonical Correlation of Expectancy Change Measures and  
Alcoholism Chronicity and Drinking History Variables

Number	Eigenvalue	Canonical Correlation	Chi-Square	df	Significance
1	0.35793	0.59827	45.07121	45	0.469
2	0.22133	0.47045	22.25355	32	0.900
3	0.11079	0.33285	9.37005	21	0.986
4	0.05395	0.23227	3.32269	12	0.993
5	0.00902	0.09496	0.46648	5	0.993

Table 7

Stepwise Discriminant Analysis Using Expectancy Change Measures  
As Discriminating Variables

<u>Eigenvalue</u>	<u>Percent of Variance</u>	<u>Canonical Correlation</u>	<u>Chi-Squared</u>	<u>df</u>	<u>Significance</u>
0.02966	100.00	0.1697246	1.6807	1	0.1948

Depression, Anxiety, and Alcoholism Chronicity

It was hypothesized that inpatients being treated for alcohol abuse would be significantly discriminated from nonalcoholic inpatients on the basis of measures of depression and anxiety. Discriminant analysis using the Wilks' Lambda selection criterion was performed using subjects' BDI, STAI A-Trait, and STAI A-State scores as discriminating variables. The results of this discriminant analysis are reported in Table 8. This discriminant analysis produced a significant canonical discriminant function,  $X^2(2) = 24.01$ ,  $p < .001$ , by which 76.67% of alcoholic and nonalcoholic inpatients could be correctly classified. This significant canonical discriminant function included scores on the STAI A-Trait and BDI scales as the only discriminating variables. Pooled within-groups correlations between the significant canonical discriminant function and scores on the STAI A-Trait, STAI A-State, and BDI scales were computed in order to determine the independent contribution of each of these measures to the discrimination of alcoholic and nonalcoholic inpatients. The results of this analysis are summarized in Table 9. Inspection of the table reveals that STAI A-Trait scores made the largest independent contribution to the discrimination of alcoholic and nonalcoholic inpatients, while BDI scores made the smallest independent contribution.

Individual t-tests were performed to probe differences in BDI, STAI A-Trait, and STAI A-State scores for alcoholic and nonalcoholic inpatients. The results of this analysis are summarized in Table 10. Inspection of the table reveals that alcoholic inpatients obtained significantly higher mean scores on the STAI A-Trait and A-State scales than

Table 8

Stepwise Discriminant Analysis Using STAI A-Trait, STAI A-State, and  
BDI Scores as Discriminating Variables

<u>Eigenvalue</u>	<u>Percent of Variance</u>	<u>Canonical Correlation</u>	<u>Chi-Squared</u>	<u>df</u>	<u>Significance</u>
0.52386	100.00	0.5863190	24.011	2	0.0000

Table 9

Pooled Within-Groups Correlations Between Canonical Discriminant Function  
And STAI A-Trait, STAI A-State, and BDI Scores

STAI A-Trait	0.84372
STAI A-State	0.50669
BDI	0.18834

Table 10

Mean Scores on the BDI, STAI A-Trait, and STAI A-State Scales  
Between Groups (n = 30)

<u>Variable</u>	<u>Alcoholics</u>		<u>Nonalcoholics</u>		<u>df</u>	<u>t-Value</u>
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>		
BDI	10.20	6.272	8.53	6.163	58	1.04*
STAI A-Trait	46.10	9.873	35.07	8.448	58	4.65***
STAI A-State	42.80	9.412	37.03	11.376	58	2.14**

\*p = .304

\*\*p = .037

\*\*\*p < .001



did nonalcoholic inpatients. No significant differences in mean BDI scores was obtained between the two groups. The results of the discriminant analysis suggest that high trait- and state anxiety is associated with increased alcoholism chronicity. However, alcoholic inpatients do not appear to be more depressed than patients admitted to the hospital for general medical concerns, according to the results of the present investigation.

It was also hypothesized that canonical correlation analysis would associate higher depression and anxiety scores with indices of increased alcohol intake and alcoholism chronicity. The correlation matrix of BDI, STAI A-Trait scores, and STAI A-State scores and the nine alcoholism chronicity and drinking history variables was subjected to canonical correlation analysis in order to test this hypothesis. The results of this canonical correlation analysis are summarized in Table 11. Inspection of the table reveals that one significant relationship was extracted from the above correlation matrix through canonical analysis,  $X^2_{(27)} = 53.91$ ,  $p < .005$ , which accounted for approximately 47% of the variance shared by the two sets of variables. The canonical coefficients for each variable in both sets are displayed in Table 12. Inspection of the table reveals that this significant canonical variate tended to associate higher Typical Day SEC scores, lower Monthly SEC scores, and lower Ph scores from the DP with lower STAI A-Trait scores, lower BDI scores, and higher STAI A-State scores. The

Table 11

Canonical Correlation of BDI, STAI A-Trait, and STAI A-State Scores and Alcoholism Chronicity and Drinking History Variables

Number	Eigenvalue	Canonical Correlation	Chi-Square	d	Significance
1	0.46714	0.68348	53.91496	27	0.002
2	0.21384	0.46243	20.86617	16	0.184
3	0.14517	0.38101	8.23483	7	0.312

Table 12

Canonical Coefficients for BDI, STAI A-State, and STAI A-Trait Scores and  
Alcoholism Chronicity and Drinking History Variables

Coefficients for Canonical Variables of the First Set

Typical Day SEC Score	1.34988
Monthly SEC Score	-1.39702
Personal Record SEC Score	-0.15721
Age of First Drink	-0.10029
Age of First Intoxication	0.20357
Consecutive Hours of Drinking	-0.17600
Consecutive Days of Abstinence	-0.22861
MAST Score	-0.32441
Ph Score	-0.47049

Coefficients for Canonical Variables of the Second Set

BDI	-0.33079
STAI A-State	0.14760
STAI A-Trait	-0.87056

results suggest that the canonical correlation and discriminant analyses have extracted two complementary relationships between measures of anxiety and alcoholism chronicity. The results of the discriminant analysis suggest that high trait- and state-anxiety is associated with increased alcoholism chronicity, while the results of the canonical correlation analysis suggest that occasional heavy drinking that does not involve a component of physiological addiction to ethanol is associated with high state-anxiety and low trait-anxiety and depression.

#### Expectations for Punishment from Alcohol Use

In order to compare the strength of expectations for punishment from drinking reported by alcoholic and nonalcoholic inpatients, a comparison of group means for the punishment expectancy indices derived from the DS was conducted by means of the Student's  $t$  statistic. It was hypothesized that inpatients recently admitted for alcoholism rehabilitation would display a significantly lower expectation for punishment from alcohol use than general medical inpatients. This hypothesis was not confirmed by the data analysis. Alcoholic inpatients obtained a significantly higher "Physical Punishment Expectancy Index" (PPEI),  $t_{(58)} = 8.06$ ,  $p < .001$ , a significantly higher "Social Punishment Expectancy Index" (SPEI),  $t_{(58)} = 8.87$ ,  $p < .001$ , and a significantly higher "Total Punishment Expectancy Index" (TPEI),  $t_{(58)} = 9.44$ ,  $p < .001$ , during the initial data collection than did nonalcoholic inpatients on these same measures.

It was also hypothesized that inpatients completing the course of alcoholism rehabilitation would display a significantly greater expectation for punishment from alcohol use when compared to their pre-treatment levels. This hypothesis was not confirmed by the data analysis. The t-tests for correlated samples revealed no significant change in the alcoholics' mean Physical Punishment Expectancy Index,  $t_{(29)} = -0.60$ ,  $p = .55$ , in the mean Social Punishment Expectancy Index,  $t_{(29)} = -0.05$ ,  $p = .96$ , and in the mean Total Punishment Expectancy Index,  $t_{(29)} = -0.37$ ,  $p = .72$ , from the initial data collection to follow-up approximately three weeks later. Inpatients treated for alcohol abuse still obtained a significantly higher mean score at follow-up in Physical Punishment Expectancy Index,  $t_{(58)} = 8.08$ ,  $p < .001$ , in mean Social Punishment Expectancy Index,  $t_{(58)} = 8.79$ ,  $p < .001$ , and in mean Total Punishment Expectancy Index,  $t_{(58)} = 9.02$ ,  $p < .001$ , than did nonalcoholic inpatients during the initial data collection.

The t-tests for correlated measures revealed that nonalcoholic inpatients expected significantly more physical punishment than social punishment from alcohol use,  $t_{(29)} = 4.68$ ,  $p < .001$ , while inpatients being treated for alcohol abuse displayed no significant differences between their mean Physical Punishment Expectancy Index and mean Social Punishment Expectancy Index obtained during the initial data collection,  $t_{(29)} = -0.49$ ,  $p = .63$ , or at follow-up,  $t_{(29)} = -1.00$ ,  $p = .33$ . The means for both groups on all the punishment expectancy indices are presented in Table 13.

Table 13

Mean Punishment Expectancies\* for Both Groups (n = 30)

	<u>Initial Data Collection</u>		<u>Follow-up</u>	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
<u>Alcoholics</u>				
Physical Punishment (PPEI)	7.14	1.401	7.29	1.565
Social Punishment (SPEI)	6.96	2.194	6.98	2.242
Total Punishment (TPEI)	7.05	1.528	7.14	1.727
<u>Nonalcoholics</u>	<u>Mean</u>	<u>S.D.</u>		
Physical Punishment (PPEI)	3.39	2.129		
Social Punishment (SPEI)	2.36	1.802		
Total Punishment (TPEI)	2.88	1.878		

\* 1 = punishment very unlikely; 10 = punishment very likely

## DISCUSSION

The results of the present investigation suggest that a higher level of diffuse and widespread expectations for reinforcement from drinking is associated with increased alcoholism chronicity. Alcoholic inpatients obtained significantly higher mean scores on all six AEQ factors than did nonalcoholic inpatients. Greater severity of life problems associated with alcohol use was also found to be significantly related to higher scores on AEQ Factor 1. This factor contained 31% (n = 28) of all the expectancy items on the questionnaire, and it has been labelled as the most general of all AEQ factors, reflecting expectations that alcohol will act as a global positive transforming agent (Brown, et. al., 1980).

These results support the findings of previous research which demonstrated a positive relationship between the generality of expectations for reinforcement from substance abuse and the extent or severity of actual substance abuse, including alcohol consumption (Battistich & Zucker, 1980). Assuming that the expectancy items on the AEQ reflect a mixture of both positive and negative reinforcement contingencies, the results of the present research also support the contention that alcoholism and increased alcohol intake are associated with expectations reflecting "high negative - high positive" reinforcement contingencies (Farber et. al., 1980). This assumption seems tenable since the AEQ was developed to sample the domain of expectations for reinforcement from drinking (Brown, et. al., 1980).

The present findings are inconsistent with previous research suggesting that expectations for reinforcement from drinking become more specific and focused upon sexual and aggressive concerns as alcoholism chronicity increases (Brown et. al., 1980). The apparent inconsistency between the present findings and previous research can possibly be resolved through reference to the psychometric properties of the AEQ and the characteristics of subjects sampled across studies. The Brown, et. al. (1980) study focused upon the expectations for reinforcement from drinking displayed by college students characterized by social drinking and moderate levels of alcohol consumption. It is possible that in younger, nonclinical samples increased alcohol intake is associated with expectations for reinforcement reflecting "high negative - low positive" reinforcement contingencies, which tend to load more heavily on specific AEQ factors reflecting concerns with sexuality and aggression. Such an interpretation is consistent with previous research finding increased levels of alcohol consumption, and even alcoholism chronicity, to be associated with expectations reflecting "high negative - low positive" reinforcement contingencies (Farber et. al., 1980).

Future research examining the relationship of age, extent of alcohol consumption, level of alcoholism chronicity, and the quality of expectations for reinforcement from drinking is necessary in order to determine whether increased alcohol consumption in younger, non-clinical samples is associated with expectations reflecting "high



negative - low positive" reinforcement contingencies. Considered in light of the present research, confirmation of such a hypothesis would suggest that one characteristic associated with the development of chronic alcoholism is the individual's transition from an expectancy structure reflecting high negative - low positive reinforcement contingencies to expectations reflecting high negative - high positive reinforcement.

This hypothesized developmental transition in the expectancy structure of the alcoholic is not inconsistent with the cognitive-behavioral theories of alcoholism discussed earlier (Donovan & O'Leary, 1979; Marlatt, 1976). These theorists contend that the alcoholic's lack of available social skills and diminished sense of personal efficacy increase the probability of drinking in response to aversive, anxiety-arousing internal and external stimuli. It is consistent to assume that the young, problem-drinker develops an expectancy structure characterized by a preponderance of expectations for reinforcement from drinking reflecting negative reinforcement contingencies, while the young nonalcoholic develops an expectancy structure reflecting positive reinforcement contingencies. The anxiety- or tension-reducing effects of alcohol consumption may reinforce the problem-drinker's beliefs that drinking will result in the increased control and efficacy necessary to cope with anxiety-arousing internal or external stimuli. As the drinking response becomes more chronic,

it is perhaps generalized to new and more varied situations and stimuli involving positive reinforcement contingencies as well. The problem-drinker then develops more generalized expectancies reflecting both negative and positive reinforcement contingencies.

If expectations for reinforcement from drinking are viewed as rationalizations or manifestations of the alcoholic's ego-defense system, the theorized transition to a generalized expectancy structure as a characteristic of the development of chronic alcoholism is consistent with past observations and theories emphasizing an increase in the alcoholic's use of rationalizations and mechanisms of denial during a "crucial phase" in the development of chronic alcoholism (Coleman, 1976; Jellinek, 1952, 1971; Wikler, 1973).

The finding that alcoholic inpatients obtained significantly higher mean scores on measures of state- and trait-anxiety than did nonalcoholic inpatients is also consistent with the cognitive-behavioral theories of alcoholism, emphasizing the roles of anxiety and negative reinforcement in the development of the disorder (Donovan & O'Leary, 1979; Marlatt, 1976). The results of the present investigation also indicate that increased alcohol intake on an occasional basis that does not involve a component of physiological addiction to ethanol is significantly related to low scores on measures of trait-anxiety and depression, and high scores on measures of state-anxiety.

These results may possibly indicate that occasional immoderate drinking as a coping response to anxiety as a state phenomenon serves as a prelude to more chronic immoderate drinking and alcoholism as a

coping response to anxiety as a trait as well as a state phenomenon. This speculation is consistent with the notion that occasional immoderate drinking may be an "early warning sign" for the development of chronic alcoholism (Coleman, 1976). This interpretation is also consistent with the theoretical contention offered in the present manuscript that the prealcoholic drinks in response to relatively circumscribed anxiety-arousing or aversive stimuli (i.e., state variables) and develops a relatively specific expectancy structure reflecting negative reinforcement contingencies, before the drinking response becomes more chronic and a more generalized expectancy structure develops. Future research, preferably longitudinal in nature, investigating the relationship of trait- and state-anxiety to a variety of alcohol consumption patterns, alcoholism chronicity, and alcohol expectancy variables is necessary to determine the validity of these interpretations.

The results of the present study also indicated that alcoholic inpatients were not significantly more depressed than nonalcoholic inpatients admitted to the hospital for general medical concerns, as assessed by scores on the BDI. However, the absolute magnitude of the mean score on the BDI obtained by alcoholic inpatients approached a level that would qualify the group as "mildly depressed" (Bumberry, Oliver, & McClure, 1978). Future research is necessary to determine whether the "mild depression" displayed by alcoholic inpatients is a result of being an inpatient or is caused by some variable specific to alcoholism.

Perception of noncontingency, assessed through expectancy change measures derived from the anagram task, was not found to be significantly related to indices of alcoholism chronicity or patterns of alcohol consumption. The present findings also indicated that alcoholic inpatients could not be significantly discriminated from nonalcoholic inpatients on the basis of measures of expectancy change. These results are consistent with previous research indicating that alcoholics display appropriate, outcome-dependent expectancy change on skill tasks, possibly due to the greater salience of task characteristics for such individuals (O'Leary et. al., 1978). The higher level of field dependence among alcoholics (Witkin, 1965) may require that a new operational definition of the perception of noncontingency between response and reinforcement, less affected by the salience of task characteristics than measures of expectancy change, is necessary in order to evaluate the role of learned helplessness in the development of alcoholism.

Alcoholic inpatients were found to expect a significantly greater likelihood of physical and social punishment from drinking during the initial data collection and at follow-up than did non-alcoholic inpatients. These findings suggest that alcoholics do tend to display realistic expectations for punishment as a consequence of their drinking, in contrast to the results of previous research (Lowe & Thomas, 1977). No differences were found in the expectations for punishment reported by alcoholic inpatients over the course of treatment. This lack of change in the expectations

for punishment reported by alcoholic inpatients can possibly be interpreted as indicating that alcoholism rehabilitation had no effect on these measures. However, it is also possible that since alcoholic inpatients demonstrated such a high level of expectation for punishment at the beginning of treatment, the effects of alcoholism rehabilitation were superimposed upon a tendency toward statistical regression in these measures, thereby negating any statistically significant increase in the likelihood of punishment expected by alcoholics over the course of inpatient treatment. The course of inpatient alcoholism rehabilitation may have still inoculated the alcoholic inpatients against the reduced salience of expectations for punishment that could possibly result from prolonged abstinence from alcohol over the period of hospitalization.

The results of the present investigation may have implications for the treatment of alcoholism that warrant further investigation. Despite the current emotionally-laden controversy regarding the validity of "controlled drinking" as a treatment goal for alcoholism (Sobell & Sobell, 1973), it is possible that both controlled drinking and total abstinence from alcohol are useful as treatment goals, depending upon the characteristics of the individual who tends to abuse alcohol. The results of the present study may offer a potential means for identifying individual differences among those who abuse alcohol that are related to varying levels of alcoholism chronicity, and will aid in the establishment of a treatment program for alcohol abuse that is founded on an empirical basis. An individual

characterized by high state-anxiety and occasional immoderate drinking in response to relatively circumscribed aversive stimuli, who also displays expectations for reinforcement from drinking reflecting high negative - low positive reinforcement contingencies, may benefit most from a treatment approach geared toward controlled drinking. Total abstinence from alcohol may be more beneficial for the chronic, daily drinker characterized by high trait- and state-anxiety, who tends to drink immoderately in a wide range of situations and displays expectations for reinforcement reflecting high negative - high positive reinforcement contingencies. These hypotheses can only be speculative in the absence of empirical test. However, the results of the present study may represent the foundations of a cognitive-expectancy profile also related to trait- and state-anxiety, that can be used to conceptualize the diagnosis and treatment of alcohol abuse in a more differentiated manner.

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APPENDIX A



DATA SHEET (cont'd)

Given that you continue to consume alcohol at your usual rate:

(4) What is the likelihood that you will suffer an increased risk of developing irreparable brain damage?

·	·	·	·	·	·
very	unlikely		likely	very	
unlikely				likely	

(5) What is the likelihood that you will be unable to maintain employment over an extended period of time (i.e. five years) as a consequence of your drinking?

·	·	·	·	·	·
very	unlikely		likely	very	
unlikely				likely	

(6) What is the likelihood that you will neglect friends as a consequence of your drinking?

·	·	·	·	·	·
very	unlikely		likely	very	
unlikely				likely	

(7) What is the likelihood that you will neglect family members as a consequence of your drinking?

·	·	·	·	·	·
very	unlikely		likely	very	
unlikely				likely	

(8) What is the likelihood of your being arrested as a result of alcohol intoxication (e.g. DWI)?

·	·	·	·	·	·
very	unlikely		likely	very	
unlikely				likely	

APPENDIX B



APPENDIX B

Subject Code: \_\_\_\_\_

ALCOHOL EXPECTANCY QUESTIONNAIRE

INSTRUCTIONS

In this questionnaire we are interested in what your personal beliefs are about alcohol.

When answering the questionnaire, read each statement carefully and respond according to what your own personal thoughts, feelings and beliefs are about drinking. We are only interested in what happens when you personally drink.

IF ALCOHOL SOMETIMES OR ALWAYS HAS THE STATED EFFECT ON YOU, CHECK I AGREE.  
IF ALCOHOL DOES NOT HAVE THE STATED EFFECT ON YOU, CHECK I DISAGREE.

Your responses are completely anonymous, that is, you will not be identified with this material in any way. Please be accurate and answer all items.

ANY QUESTIONS? PLEASE ASK THE EXAMINER

RESPOND TO THESE ITEMS ACCORDING TO YOUR  
PERSONAL BELIEFS ABOUT DRINKING

	<u>AGREE</u>	<u>DISAGREE</u>
1. Alcohol can transform my personality.	_____	_____
2. Drinking helps me feel whatever way I want to feel.	_____	_____
3. Some alcohol has a pleasant, cleansing, tingly taste.	_____	_____
4. Alcohol makes me feel happy.	_____	_____
5. Drinking adds a certain warmth to social occasions.	_____	_____
6. Sweet, mixed drinks taste good.	_____	_____
7. When I drink, it is easier to open up and express my feelings.	_____	_____
8. Time passes quickly when I am drinking.	_____	_____
9. When they drink, women become more sexually relaxed.	_____	_____
10. Drinking makes me feel flushed.	_____	_____
11. I feel powerful when I drink, as if I can really influence others to do as I want.	_____	_____
12. Drinking increases male aggressiveness.	_____	_____
13. Alcohol lets my fantasies flow more easily.	_____	_____
14. Drinking gives me more confidence in myself.	_____	_____
15. Drinking makes me feel good.	_____	_____
RESPOND TO THESE ITEMS ACCORDING TO YOUR BELIEFS ABOUT DRINKING		
16. I feel more creative after I have been drinking.	_____	_____
17. Having a few drinks is a nice way to celebrate special occasions.	_____	_____
18. I become lustful when I drink.	_____	_____
19. When I am drinking I feel freer to be myself and do whatever I want.	_____	_____
20. Drinking makes it easier to concentrate on the good feelings I have at the time.	_____	_____
21. Alcohol allows me to be more assertive.	_____	_____
22. When I feel "high" from drinking, everything seems to feel better.	_____	_____
23. Alcohol decreases my hostilities.	_____	_____

RESPOND TO THESE ITEMS ACCORDING TO YOUR  
 PERSONAL BELIEFS ABOUT DRINKING

	<u>AGREE</u>	<u>DISAGREE</u>
24. If I am nervous about having sex, alcohol makes me feel better.	_____	_____
25. Drinking relieves boredom.	_____	_____
26. I find that conversing with members of the opposite sex is easier for me after I have a few drinks.	_____	_____
27. After a few drinks, I feel less sexually inhibited.	_____	_____
28. Drinking is pleasurable because it is enjoyable to join in with people who are enjoying themselves.	_____	_____
29. I like the taste of some alcoholic beverages.	_____	_____
30. If I am feeling restricted in any way, a few drinks makes me feel better.	_____	_____
31. Men are friendlier when they drink.	_____	_____
32. It is easier for me to meet new people if I have been drinking.	_____	_____
33. After a few drinks, it is easier to pick a fight.	_____	_____
34. Alcohol eliminates feelings of inferiority.	_____	_____
35. Alcohol makes women more sensuous.	_____	_____
36. If I have a couple of drinks, it is easier to express my feelings.	_____	_____
37. I feel less bothered by physical ills after a few drinks.	_____	_____
38. Alcohol makes me need less attention from others.	_____	_____
39. Alcohol makes me feel closer to people.	_____	_____
40. After a few drinks, I feel more self-reliant than usual.	_____	_____
41. After a few drinks, I don't worry as much about what other people think of me.	_____	_____
42. When drinking, I do not consider myself totally accountable or responsible for my behavior.	_____	_____
43. Alcohol enables me to have a better time at parties.	_____	_____

RESPOND TO THESE ITEMS ACCORDING TO YOUR  
PERSONAL BELIEFS ABOUT DRINKING

	<u>AGREE</u>	<u>DISAGREE</u>
44. Anything which requires a relaxed style could be facilitated by alcohol.	_____	_____
45. Drinking makes the future seems brighter.	_____	_____
RESPOND TO THESE ITEMS ACCORDING TO YOUR BELIEFS ABOUT DRINKING		
46. I am not as tense if I am drinking.	_____	_____
47. I often feel sexier after I have a couple of drinks.	_____	_____
48. Having a few drinks helps me relax in a social situation	_____	_____
49. I drink when I am feeling mad.	_____	_____
50. Drinking alone or with just one other person makes me feel calm and serene.	_____	_____
51. After a few drinks, I feel brave and more capable of fighting.	_____	_____
52. Drinking can make me more satisfied with myself.	_____	_____
53. There is more comaraderie in a group of people who have been drinking.	_____	_____
54. My feelings of isolation and alienation decrease when I drink.	_____	_____
55. A few drinks makes me feel less in touch with what is going on around me.	_____	_____
56. Alcohol makes me more tolerant of people I don't enjoy.	_____	_____
57. Alcohol helps me sleep better.	_____	_____
58. Women are friendlier after they have a few drinks.	_____	_____
59. I am a better lover after a few drinks.	_____	_____
60. Women talk more after they have a few drinks.	_____	_____
61. Alcohol decreases muscular tension.	_____	_____
62. Alcohol makes me worry less.	_____	_____
63. A few drinks makes it easier to talk to people.	_____	_____
64. After a few drinks I am usually in a better mood.	_____	_____
65. Alcohol seems like magic.	_____	_____

RESPOND TO THESE ITEMS ACCORDING TO YOUR

## PERSONAL BELIEFS ABOUT DRINKING

	<u>AGREE</u>	<u>DISAGREE</u>
66. Women can have orgasms more easily if they have been drinking.	_____	_____
67. At times, drinking is like permission to forget problems.	_____	_____
68. Drinking helps me get out of a depressed mood.	_____	_____
69. After I have a couple of drinks, I feel I am a more caring sharing person.	_____	_____
70. Alcohol decreases my feelings of guilt about not working.	_____	_____
71. I feel more coordinated after I drink.	_____	_____
72. Alcohol makes me more interesting.	_____	_____
73. A few drinks makes me feel less shy.	_____	_____
74. If I am tense or anxious, having a few drinks makes me feel better.	_____	_____
75. Alcohol enables me to fall asleep more easily.	_____	_____
RESPOND TO THESE ITEMS ACCORDING TO YOUR BELIEFS ABOUT DRINKING		
76. If I am feeling afraid, alcohol decreases my fears.	_____	_____
77. Having a drink in my hand makes me feel secure in difficult social situations.	_____	_____
78. Alcohol acts as an anesthetic, that is, it deadens pain.	_____	_____
79. I enjoy having sex more if I have some alcohol.	_____	_____
80. I am more romantic when I drink.	_____	_____
81. I feel more masculine after a few drinks.	_____	_____
82. When I am feeling antisocial, drinking makes me more gregarious.	_____	_____
83. Alcohol makes me feel better physically.	_____	_____
84. Sometimes when I drink alone or with one other person it is easy to feel cozy and romantic.	_____	_____
85. I feel like more of a happy-go-lucky person when I drink.	_____	_____

RESPOND TO THESE ITEMS ACCORDING TO YOUR  
PERSONAL BELIEFS ABOUT DRINKING

86. Drinking makes get-togethers more fun.
87. Alcohol makes it easier to forget bad feelings.
88. After a few drinks, I am more sexually responsive.
89. If I am cold, having a few drinks gives me a sense of warmth.
90. It is easier to act on my feelings after I have a few drinks.

AGREE

DISAGREE

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

APPENDIX C

APPENDIX C

ALCOHOL-RELATED LIFE PROBLEMS SCALE

Now I'm going to ask you some more questions to help me understand your drinking patterns. Please answer them as honestly and as accurately as you can. (Check only items answered in critical direction.)

1. Do you think you are a normal drinker? (N)\_\_\_\_(2)
  2. Have you ever awakened the morning after some drinking and found that you could not remember a part of the evening? (Y)\_\_\_\_(2)
  3. Does any member of your family ever worry or complain about your drinking? (Y)\_\_\_\_(1)
  4. Can you stop drinking without a struggle after one or two drinks? (N)\_\_\_\_(2) \_\_\_\_\_(2)
  5. Do you ever feel guilty about your drinking? (Y)\_\_\_\_(1)
  6. Do friends or relatives think you are a normal drinker? (N)\_\_\_\_(2)
  7. Are you always able to stop drinking when you want to? (N)\_\_\_\_(2)
  8. Have you ever attended a meeting of Alcoholics Anonymous? (Y)\_\_\_\_(5)
- If yes, about how many meetings have you attended? \_\_\_\_\_
9. Have you gotten into physical fights when drinking? (Y)\_\_\_\_(1)
  10. Has drinking ever created problems between you and your wife/husband? (Y)\_\_\_\_(2)
  11. Has any member of your family ever gone to anyone for help about your drinking? (Y)\_\_\_\_(2)
  12. Have you ever lost friends or lovers because of your drinking? (Y)\_\_\_\_(2)
  13. Have you ever gotten into trouble at work because of your drinking? (Y)\_\_\_\_(2)
  14. Have you ever lost a job because of drinking? (Y)\_\_\_\_(2)

TOTAL points, this page (both columns)

\_\_\_\_\_  
A1

\_\_\_\_\_  
B1



15. Have you ever neglected your obligations, your family or your work for two or more days because of drinking? (Y)\_\_\_(2)
16. Do you ever drink in the morning? (Y)\_\_\_(1) \_\_\_(1)
17. Have you ever been told that you have liver trouble? (Y)\_\_\_(2)
18. Have you ever had severe shaking after drinking? (Y)\_\_\_(2) \_\_\_(3)
19. Have you ever heard voices or seen things that were not there after heavy drinking? (Y)\_\_\_(2) \_\_\_(4)
20. Have you ever gone to anyone for help about your drinking? (Y)\_\_\_(5)
21. Have you ever been in a hospital because of drinking? (Y)\_\_\_(5)
22. Have you ever been a patient in a psychiatric ward of a general hospital?  
If YES, was drinking a part of the problem that resulted in hospitalization? (Y)\_\_\_(2)
23. Have you ever been seen at a psychiatric hospital or mental health clinic or gone to any doctor, social worker, or clergy for help with any emotional problem?  
If YES, was drinking a part of the problem? (Y)\_\_\_(2)
24. Have you ever been arrested, even for a few hours, because of drunk behavior, other than driving? (Y)\_\_\_(2)
25. Have you ever been arrested for drunk driving, driving while intoxicated, or driving under the influence of alcoholic beverages? (Y)\_\_\_(2)
26. Have you ever had a hangover? (Y) \_\_\_(1)
27. Have you ever had vague feelings of fear, anxiety, or nervousness after drinking? (Y) \_\_\_(1)
28. Have you ever felt a craving or strong need for a drink? (Y) \_\_\_(1)
29. Are you able to drink more now than you used to without feeling the same effect? (Y) \_\_\_(1)
30. Has drinking or stopping drinking ever resulted in your having a seizure or convulsion? (Y) \_\_\_(4)

A2B2

Total Column A for both pages  $\frac{\quad}{A1} + \frac{\quad}{A2} = \underline{\quad}$  MAST Score

Total Column B for both pages  $\frac{\quad}{B1} + \frac{\quad}{B2} = \underline{\quad}$  Ph Score

MAST Score is an indicator of severity and extent of life problems related to drinking.

Ph Score is an indicator of the degree of pharmacological addiction.

**APPENDIX D**

APPENDIX D

DIRECTIONS: Use this sheet to indicate the different kinds of alcoholic beverages you drink during a typical drinking day. Circle the different kinds of alcoholic beverages you're likely to drink, and record the brand names or proof, as well as the amount of each beverage you consume, in the spaces provided.

WHISKEY (i.e. Scotch, Bourbon, Rye, Blended, Corn, Canadian, Irish, etc.)

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

GIN

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

VODKA

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

RUM

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

TEQUILA

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

BRANDY

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

WINE

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

BEER

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

LIQUEUR

Kind \_\_\_\_\_

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_

OTHER

Brand Name (Proof) \_\_\_\_\_ Amount \_\_\_\_\_



APPROVAL SHEET

The dissertation submitted by Matthew M. Zarantonello has been read and approved by the following committee:

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

4-11-83  
Date

  
Director's Signature