AN ABSTRACT OF THE THESIS OF

Angelle M. Sander for the Master of Science in Psychology presented on   December 9, 1991

Title: Differences in Cognitive Performance Between Male Social Drinkers with Positive and Negative Family Histories of Alcoholism

Abstract approved: *Cooper B. Holmes*

Several studies have shown that alcoholics are impaired relative to controls in the areas of abstraction/problem-solving, learning/memory, and perceptual-motor skills. Other studies have proposed that the effects of alcohol lie on a continuum ranging from that seen in light social drinkers to that seen in alcoholics. Previous studies on cognitive changes in social drinkers have yielded conflicting results. There have been other studies which have shown that nonalcoholic children of alcoholics perform poorly on cognitive tests compared to children of nonalcoholic parents.

The present study compared performance on a test of abstraction ability between male social drinkers with positive and negative family histories of alcoholism. The two independent variables investigated were amount of social drinking (abstainer, light/moderate, heavy) and family history of alcoholism (FH+ and FH-). The dependent variable was the mental-age score from the Shipley Institute of Living abstraction scale (SILS). Participants were 72 men college students, ages 18-22, from a midwestern and southern university. A 2 x 3 fixed effects factorial design was used

to analyze the data. The results revealed that amount of social drinking and family history did not interact to affect abstraction performance. In addition, neither the main effect of social drinking or that of family history was significant. The results were contrasted with those of previous studies, with an emphasis on differences in methodology and definition of variables.

Differences in Cognitive Performance Between Male
Social Drinkers with Positive and Negative Family
Histories of Alcoholism

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A Thesis

Presented to

the Division of Psychology and Special Education

Emporia State University

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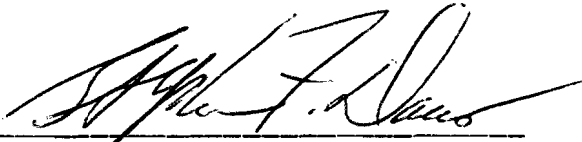
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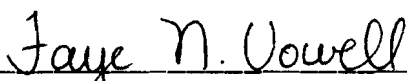
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December 1991

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Chapter 1

Introduction

Past research has shown that alcoholics perform poorly in comparison to nonalcoholic controls on tests measuring learning, memory, perceptual-motor, abstract reasoning, and problem-solving abilities (Grant, 1987; Parsons & Leber, 1981). Although most researchers would agree that excessive use of alcohol can be detrimental to cognitive functioning, there is little known regarding the effects of moderate amounts of social drinking on cognitive abilities. Ryback (1971) proposed that the effects of alcohol lie on a continuum, beginning with mild to no effect on light social drinkers, and ending with the serious impairment seen in patients with Korsakoff's syndrome. If this continuum actually exists, then we should see a decrease in cognitive functioning with increasing levels of social drinking (Parsons, 1986). Several studies have been conducted to test the continuum hypothesis, with conflicting results.

A majority of the studies have focused on the relationship between cognitive performance and three drinking variables: frequency of drinking (average number of days on which an individual drinks alcohol); average quantity drunk per drinking occasion (QPO); and lifetime consumption (QPO X years of drinking). If there is a continuum of alcohol's effect on cognitive abilities, then it would be expected that as these three variables increase, performance on tests which measure these abilities would decrease.

The first study which focused on this question was conducted by Parker and Noble (1977). They tested a sample of 102 men ($\underline{M}$

age = 43). They found that there was a negative relationship between QPO and performance on three cognitive tests: the Shipley Institute of Living Scale (SILS); the Halstead Category Test; and three scores from the Wisconsin Card Sorting Test (WCST). In all cases, the more alcohol consumed per occasion, the lower the scores on the test. According to Parker and Noble (1977) there could be three explanations for the results. First, alcohol consumption could lead to cognitive impairment. Second, persons with poor cognitive abilities may drink more than those with greater abilities. Finally, there could be a third factor, such as life stress, which leads to both cognitive impairment and drinking.

In 1980, Parker and Noble confirmed their 1977 results using a sample of 45 men college students (M age = 22.6). Subjects completed a drinking questionnaire and the SILS. The average frequency of drinking was three drinks two or three times each week. the results showed that as QPO increased, scores on the vocabulary and abstraction sections of the SILS decreased.

Jones and Jones (1980) provided confirmation of Parker and Noble's (1977) results by testing 16 light (three drinks per month) and 16 moderate (18 drinks per month) female drinkers in their early 20's to mid-40's. The test employed was one of memory for a list of words. An important addition to the work of previous studies was the use of a Breathalyzer to determine if subjects were under the influence of alcohol at the time of testing, in which case they were excluded from the study. Jones and Jones found that the moderate drinkers had lower memory ratios (short-term memory

divided by immediate memory) than light drinkers. In other words, the moderate drinkers were less able than the light drinkers to recall words after a brief delay.

MacVane, Butters, Montgomery, and Farber (1982) studied 106 middle-aged men, including 48 light to moderate (about 1.5 drinks twice per week) and 58 heavy (about 4.5 drinks five times per week) social drinkers. Subjects completed a drinking questionnaire, the Wisconsin Card Sorting Test (WCST), the Digit Symbol Test, a vocabulary test, and a test of memory for five words after intervals of 15 and 30 seconds. In the total sample, scores on the 15- and 30-second memory test decreased as QPO increased. Analyzed separately, the heavy drinkers showed a decrease in WCST and 30-second memory scores with an increase in QPO. Surprisingly, as lifetime consumption increased, so did 30-second memory scores. Finally, Digit Symbol scores decreased as frequency of drinking increased. As for the light to moderate drinkers, an increase in QPO was related to a decrease in 30-second memory and Digit Symbol scores. Although some negative relationships were found between QPO and performance on certain cognitive tasks, they were not found on the one task which their study shared in common with Parker and Noble (1977), that is the WCST. In addition, MacVane et al. found no differences in performance between the light-moderate and heavy drinkers, except on SILS vocabulary, suggesting that there may have been a basic difference in intelligence between the two groups, confounding the results.

Parsons and Fabian (1982) attempted to replicate Parker and Noble's (1977) findings. Subjects were 81 college students (21 men and 60 women) in their early 20's. Again, a drinking questionnaire and the SILS were completed by subjects. They found no relationship between QPO and scores on the SILS. They then divided the sample into heavy and light drinkers and found that for heavy drinkers, as QPO increased, the SILS conceptual quotient, which is based on a relationship between the vocabulary and abstraction scores, decreased.

Parsons and Fabian (1982) also studied community women, including both alcoholics and social drinkers. Alcoholics were included in the sample to account for the possibility that alcoholics may have been inadvertently included in the heavy drinking samples of previous studies. There was no relationship between QPO and SILS scores for the alcoholic women. In the social drinkers, as QPO increased, SILS abstraction score decreased. However, when the sample was divided into heavy and light drinkers, no significant relationships emerged. Parsons and Fabian concluded that the results of studies thus far were so inconsistent that an announcement to the public regarding the dangers of social drinking would not be justified.

Parker, Parker, Brody and Schoenberg (1983) studied a sample of 1,367 adults employed in the Detroit area. Once again, the SILS was the cognitive test employed. For the males, abstraction score decreased as QPO increased. No such relationship was found in the total sample of women. However, the women as a whole drank 60%

less often than men. To account for this difference, statistics were calculated for the subsample of women who drank at least once per week. In this subsample, abstraction scores decreased as QPO increased.

In an attempt to replicate the Parker and Noble (1977) study, Hannon, Day, Butler, Larson, and Casey (1983) reported some surprising results. Their sample consisted of 52 women and 40 men college students (M age = 20.3). Two of the tests used, the SILS and the WCST, were the same as those used in previous studies. In addition, three other tests were used: Digit Symbol; Trail Making; and the Tactual Performance Test (TPT). the significant results were that for men, the higher the QPO, the more errors they made in shifting concept on the WCST. For women, increasing QPO was related to increased perseveration and number of trials to completion on the WCST. Unlike results from Parker and Noble's (1977) study, total lifetime consumption of alcohol was significantly related to certain scores. In men, scores on the SILS vocabulary section and on the WCST decreased as lifetime consumption increased. Surprisingly, scores on Trail Making actually increased with increases in lifetime consumption. For the female sample, scores on Digit Symbol and the WCST decreased as lifetime consumption increased. Finally, greater frequency of drinking in women was predictive of low Digit Symbol scores. In men, the frequency results were in direct conflict with those of previous studies. As frequency of drinking increased, so did scores on SILS

abstraction and conceptual quotient, Trail Making, and time to completion on the TPT.

Hannon et al. (1985) replicated their 1983 study, using a Breathalyzer to test for alcohol in the subjects at the time of testing. The participants were 67 males and 103 females. None of the results of the previous study were replicated. In women, increasing QPO was related only to decreasing SILS vocabulary score, while in men, as QPO increased, so did scores on SILS abstraction and conceptual quotient and Digit Symbol. Once again, the relationship between QPO and test scores for men were in a direction opposite to that expected. In addition, these unexpected relationships were not the same as those found in the 1983 study.

Using a sample of 387 subjects (187 men and 200 women) in Stockholm, Sweden, Bergman (1985) found that there was no relationship between QPO and cognitive performance for either men or women. However, the amount of self-reported alcohol consumption during the week prior to testing was negatively correlated with both scores on cognitive tasks and with sulcal and ventricular enlargement as shown by Computerized Tomography (CT) scans in men. In other words, for men, the more alcohol drunk during the week prior to testing, the lower the scores and the larger the sulci and ventricles.

Given the inconsistent findings of the studies mentioned above, researchers attempted reversibility studies in which social drinkers were told to abstain from alcohol for a period of time, and were tested both before and after that period for any differences in

cognitive performance. The rationale was that if social drinking impairs cognitive abilities, then abilities should improve once alcohol consumption is reduced or stopped. The first such study was conducted by Birnbaum, Taylor, and Parker (1983). It involved 29 participants who were considered to be moderate drinkers (three drinks per occasion). They were divided into two groups. One group was told to reduce its alcohol intake over the next 6 weeks, while the other was instructed to maintain its average drinking pattern. At the end of the 6 weeks, the groups were tested on the SILS, WCST, Digit Symbol Test, and Raven's Progressive Matrices. Pre-test scores were also obtained. There was no difference between them in terms of changes in cognitive performance. However, the small sample suggested the need for further exploration.

Cala, Jones, Burns, Davis, Stenhouse, and Mastaglia (1983) attempted a pilot study in which they used pre- and post-tests to assess changes in five social drinkers who had remained abstinent for 6 months. These participants reduced their intake from an average of three drinks per day to zero drinks. Although scores on the Wechsler Memory Scale improved, there was no relationship between average daily alcohol consumption and test performance.

In a further study, Cala, Burns, Davis, and Jones (1984) studied 11 social drinkers who were abstinent for 6 months. At 12 months, they were tested again, and some had resumed drinking. These participants were compared to eight others who drank approximately 2.33 drinks per day for the entire 12 month period. The CT scan results of the eight participants who drank continuously

were abnormal compared to those of the abstainers. The CT scans of the abstainers improved significantly at 6 months, and became slightly abnormal again when they resumed drinking. Both groups demonstrated improvement in scores on cognitive tests.

Finally, Hannon, et al., (1985) assigned 84 social drinkers to an abstain group and 86 to a maintain group. The abstain group was instructed to not consume alcohol for 2 weeks, while the maintain group was told to maintain its current drinking pattern for 2 weeks. The abstainers did not succeed in total abstinence, but did reduce the average amount of alcohol consumed per occasion from 30 ml. to 4 ml. At the end of the 2 weeks, both groups were administered a battery of cognitive tests. Results showed that there was no difference in scores between the two groups.

Many of the above studies have used similar samples and cognitive tasks. Yet, the findings are inconsistent, suggesting that the concept of social drinking affecting cognitive abilities while in the sober state is still not clear. Given these findings, a definitive statement cannot yet be made regarding the effects of social drinking on higher mental processes. As Parker and Noble (1977) pointed out, there could be a third factor which leads to both cognitive impairment and to a tendency to drink. One such possible factor is family history of alcoholism.

There has been evidence that the brains of alcoholics having an alcoholic family member (FH+) are different from those of alcoholics with no family history of alcoholism (FH-). Begleiter, Porjesz, and Kissin (1982) found that alcoholics with an alcoholic father, brother,

or sister had abnormal evoked brain potentials.   A difference in brain potentials could possibly lead to a difference in cognitive performance.   Research has been conducted comparing the cognitive performances of FH+ and FH- alcoholics.   these studies have been referred to as familial alcoholism studies (Alterman, Gerstley, & Tarter, 1987).

Schaeffer, Parsons, and Yohman (1984) found no significant differences between FH+ and FH- male alcoholics in performance on tests of abstraction/problem-solving, learning/memory, and perceptual-motor skills.   Similarly, Alterman, et al. (1987) found no differences in cognitive performance between FH+ and FH- alcoholics in a sample of 81 Veterans Administration inpatient alcoholics (M age = 34.12).   These findings of no differences between FH+ and FH- alcoholics may be due to the possibility that the brains of both had been altered by excessive drinking.

To further investigate the effects of family history of alcoholism on cognitive performance, studies of high-risk individuals have been conducted (Alterman, et al., 1987).   These studies have focused on nonalcoholic offspring of alcoholics.   Hesselbrock, Stabenau, and Hesselbrock (1985) compared 99 subjects who had one alcoholic parent, with 47 subjects who had no history of parental alcoholism.   Neither sample had a history of alcoholism and they did not differ in the number of years they had been drinking socially. The two groups were also similar in terms of average QPO.   Although the performances of both groups on a battery of cognitive tests were within the normal range, male offspring of alcoholics scored

significantly lower on the Halstead Category Test than subjects without an alcoholic parent.

Tarter, Hegedus, Goldstein, Shelly, and Alterman (1984) studied 41 juvenile delinquents, 18 of whom had nonalcoholic parents. Neither group had any history of alcohol abuse. Both groups completed a battery of cognitive tests. The results revealed that the sons of alcoholics performed significantly poorer than those of nonalcoholics.

Schaeffer, Parsons, and Yohman (1984) found that nonalcoholics with a positive family history of alcoholism (defined as having a father, mother, brother or sister who was an alcoholic) performed worse than those with no such history on tests of abstraction/problem-solving and perceptual-motor skills. When the sample was divided into those with a parental alcoholic and those with a sibling alcoholic for the purpose of analysis, FH+ individuals still performed better than FH-.

These studies would suggest that FH+ individuals have poorer cognitive abilities on certain tasks than FH- individuals, apart from drinking history. It has also been found that adopted males with an alcoholic biological parent were four times more likely to become alcoholic than those with no alcoholic parent (Goodwin, 1981). If these studies are correct, then the inconsistent finding of the social drinking studies may be a result of the failure to take family history of alcoholism into account.

To date, only one study has focused on this issue. Parker, Parker, and Brody (1985) found that the father's drinking history did

not add significantly to the prediction of SILS abstraction score accounted for by current alcohol use in a sample of 1,367 men and women employed in the Detroit area. Neither did fathers' drinking history predict the subjects' current drinking patterns. However, a limitation of the study was that no criterion was presented to the subjects to decide whether or not the father was an alcoholic. In addition, Schaeffer et. al's (1984) results suggested that the drinking histories of the mother, brothers, and sisters should be taken into account in addition to that of the father.

The purpose of the present study was to determine if there was a difference between FH+ and FH- abstainers, light and heavy social drinkers, in terms of performance on the SILS abstraction test. The alternative hypotheses was that there would be an interaction between family history and level of social drinking, in their effects upon performance. The rejection of the null hypothesis would suggest that future studies concerning the effects of social drinking on cognitive abilities should control for the effects of family history. In the absence of an interaction effect, analysis of the main effects would provide confirmation or disconfirmation of the Schaeffer, et al. (1984) study, as well as a replication of previous studies investigating abstraction ability in social drinkers.

Chapter 2

Method

Sample

Participants were 72 men, ages 18 to 22, chosen from undergraduate psychology courses at a midwestern and a southern university. Participants received extra course crèdit for their participation. During a screening session conducted in the classroom, students completed a questionnaire concerning drinking practices and a checklist regarding the incidence of alcoholism in their immediate families. Students for the study were chosen based on their responses to these two questionnaires. Twenty-four students were chosen in each of the abstainer, light-moderate and heavy drinker categories. The determination of these categories is described in the Procedure section.

Instruments

A modified form of Cahalan, Cisin, and Crossley's (1969) drinking survey was utilized, and was titled "Alcohol Use Questionnaire" (see Appendix A). This was a self-report instrument, which requested information regarding consumption of beer, wine, and liquor over the past 6 months. The questionnaire categorized social drinkers according to the frequency with which they drank and the average quantity which they drank per occasion. Drinkers were categorized, according to the standard use of the survey, as either an abstainer, infrequent, light, moderate, or heavy drinker.

Family history of alcoholism was determined by a checklist of alcohol-related symptoms, corresponding to the National Council on

Alcoholism and Alcohol Abuse's criteria for alcoholism (see Appendix B). Participants were instructed to check the symptoms that applied for father, mother, brothers, and sisters. If the participant was unsure of an answer for a particular criterion, he was instructed to fill in a DK (Don't Know). A participant was defined as having a positive family history of alcoholism if he checked any one of the symptoms for any of the family members listed.

The Shipley Institute of Living Scale (SILS) (Shipley, 1940) was administered to each subject. The SILS consists of two sections, yielding a vocabulary score, an abstraction score, and a total conceptual quotient based on the ratio between the scores on the two sections. The vocabulary scale consists of 40 items, and the raw score is transformed to a mental-age score ranging from 9.5 to 21 years. The abstraction scale is made up of 20 items. This raw score is also converted to a mental-age equivalent ranging from 7.8 or below to 20.5. The split-half reliability coefficient for the vocabulary section is .87, while for the abstraction section, it is .89 (Shipley, 1940). The criterion validity has been established by correlating the raw scores from the SILS vocabulary and abstraction sections with the full scale intelligence quotient from the Wechsler-Bellevue Intelligence Scale (W-B). The correlation between the SILS abstraction section and the W-B IQ is .89, while that between the vocabulary section and the W-B IQ is .87. The SILS total raw scores have also been correlated with the full scale intelligence quotient from the Wechsler Adult Intelligence Scale, yielding coefficients ranging from .78 to .90 (Sines, 1958).

Procedure

The "Alcohol Use Questionnaire" and the "Family History Checklist" were administered in undergraduate psychology classes. The students were read the following instructions by the examiner:

You are participating in a study concerning drinking behavior in college students. Although we need your name to appear on the questionnaire in order to match it with a later questionnaire you may be completing, your names will be seen only by me and they will be omitted from any results which I might publish or present.

After having been read instructions, participants were asked to read the Informed Consent Form (see Appendix C) and to sign it if they were still willing to participate. They were then told,

Since your responses are confidential please answer each question honestly and to the best of your knowledge. If you are unsure about the answer to a particular question, give your best estimate. Take as much time as you need and sit quietly until everyone is finished.

Using the Cahalan Drinking Index, students were classified as either abstainers, infrequent, light, moderate, or heavy drinkers. They were also classified as FH+ or FH-. From this population, 24 students, ages 18-22, were chosen in each of the abstainer, light-moderate and heavy drinker categories. These categorizations were determined according to the standard instructions of the Cahalan

Drinking Index, taking frequency of drinking and average quantity drunk per occasion into account. The light and moderate categories were collapsed into one category, as it was difficult to obtain subjects who fit into the light category. Twelve participants per category were FH+ and the other twelve were FH-. In the cases where more than 12 students met the criteria for a particular category, the first twelve to be contacted were the ones who were included in the study. These students were contacted and asked to participate in a study concerning drinking behavior in college students. If they were interested, an appointment was made and they were asked to refrain from drinking any alcohol for 24 hours prior to the appointment.

Participants were tested in groups of 1 to 5. When they arrived for the testing session, they were once again informed that they were participating in a study about drinking behavior in college students. They were told that only the examiner would be aware of their identity and that their names would not appear on any published or presented results. The subjects were then handed the consent form and told to read it and sign it if they were still willing to participate.

Participants were then presented with the vocabulary section of the SILS and read the standard instructions. They were given 10 minutes to complete the test. They were then instructed to turn the sheet over and were read the instructions for the abstraction section, on which they also were allowed 10 minutes. After completing this section, subjects were thanked and told that they may leave their

names and addresses if they wished to receive the results of the study.

Chapter 3

Results

Two independent variables were investigated. The first was level of social drinking and there were three levels: abstainers, light-moderate, and heavy drinkers. The second variable was family history of alcoholism, with the two levels being FH+ and FH-. The dependent variable was each subject's mental-age score on the SILS abstraction scale. In addition, the mental-age score on the SILS vocabulary scale was used as a covariate, since any basic difference in subjects' vocabulary may have affected their abstraction score. The experimental design was a 2 X 3 fixed effects factorial. Analyses were conducted using a SAS General Linear Model Procedure. Two equations were run, both using SILS abstraction score (ABS) as the dependent variable. In the first equation, vocabulary score (VOC) was entered first, followed by drinking level (DRINK) then family history (FH). In the second equation, the interaction of DRINK X FH was added to the first equation. It was entered last in the equation.

Means and standard deviations for SILS abstraction scores by social drinking classification (DRINK) and family history (FH) are presented in Table 1. The results of the first equation are presented in Table 2. This equation accounted for a significant amount of the variance in ABS, $F(4, 67) = 5.29$, $p < .01$. However, this significant effect was due to the large proportion of variance accounted for by VOC, $F(1, 67) = 18.26$, $p = .0001$.

Table 1

Means and Standard Deviations for SILS Abstraction Scores by Social
Drinking Classification (DRINK) and Family History (FH)

Drink	Family	M	SD
Abstainer	FH+	16.24	2.15
	FH-	17.17	2.41
Light/Mod.	FH+	17.17	1.44
	FH-	17.95	2.66
Heavy	FH+	17.90	1.45
	FH-	16.97	2.12

Table 2

Results of Equation Predicting Abstraction Score from Vocabulary
Score, Social Drinking Classification, and Family History

	SS	df	MS	F	p
Model	74.45	4	18.61	5.29	.0009
Error	235.89	67	3.52		
Total	310.34	71			

The results of the second equation are shown in Table 3. The addition of the interaction term did not add significantly to the proportion of variance accounted for by the original equation, $F(6, 65) = 4.01$, $p < .01$. It was thus concluded that the simpler model, represented by equation 1, is more adequate in explaining the data.

Table 3

Results of equation Predicting Abstraction Score from Vocabulary
Score, Social Drinking Classification (DRINK), Family History (FH), and
DRINK X FH Interaction

	SS	df	MS	F	p
Model	83.82	6	13.97	4.01	.0018
Error	226.52	65	3.48		
Total	310.34	71			

Analysis of unique effects are presented in Table 4. The only significant effect occurred when VOC was used as the predictor of ABS, $F(1, 65) = 17.64$, $p = .0001$. Neither DRINK nor FH accounted for significant proportion of the variance in ABS.

Table 4

Unique Effects of Vocabulary Score (VOC), Social Drinking
Classification (DRINK), and Family History (FH)

	SS	df	MS	F	p
VOC	61.47	1	61.47	17.64	.0001
DRINK	4.78	2	2.39	.69	.5071
FH	5.34	1	5.53	1.34	.2123

In summary, the results revealed that the majority of the variance in students' abstraction scores could be accounted for by their scores on the vocabulary test. When vocabulary was accounted

for, neither DRINK or FH contributed significantly to the prediction of abstraction score. The interaction of DRINK X FH was also insignificant in accounting for the variance in abstraction score.

Chapter 4

Discussion

In the present study, amount of social drinking and family history of alcoholism were not found to interact to influence performance on the SILS abstraction test. In addition, neither amount of social drinking nor family history were able to significantly predict abstraction score. These findings are in disagreement with those of some past studies which show that SILS scores decreased as quantity drunk per occasion increased (Parker & Noble, 1977, 1980; Parker, et al., 1983; Parsons & Fabian, 1982). Neither are the present findings consistent with studies showing increases in SILS abstraction score with increasing frequency of drinking and quantity drunk per occasion (Hannon, et al., 1983, 1985). Instead, there was no relation at all between amount of social drinking and performance on the SILS abstraction test.

Different methods of analysis may account for the different findings. Former studies have generally utilized correlational analyses, and a few have used multiple regression. Most studies have used quantity drunk per occasion (QPO) as the dependent variable. Some have used frequency of drinking and others have used lifetime consumption. Each of these scores are numerical in nature. In the present study, both QPO and frequency were combined to place each subject in a specific drinking classification via the Cahalan Index. The use of these categories may have resulted in loss of some information. When participants' numerical drinking indexes are compared with their scores on the SILS, as in former

studies, relationships may be significant that were not found to be significant with the current analyses.

Another possible explanation for the present findings is that the SILS abstraction scale may not be an appropriate measure for detecting effects of alcohol on cognitive functioning. In the present study, scores on the vocabulary section of the SILS were found to account for a significant proportion of the variance in abstraction scores. This suggests that the SILS abstraction test is highly saturated with a verbal component. It has been demonstrated repeatedly that in alcoholics, most verbal skills, especially vocabulary, remain unaffected by prolonged drinking (Parsons & Leber, 1981). However, alcoholics have been shown to be impaired on nonverbal tests involving abstraction ability such as the Wisconsin Card Sort and the Halstead Category Test. Since the theory behind the research conducted on social drinking is Ryback's continuum hypothesis (Ryback, 1971), it should be assumed that if social drinking does affect cognitive ability, the effects should be demonstrated on the same tasks on which they are demonstrated in alcoholics. When such nonverbal abstraction measures as the WCST and the Category Test were used in previous studies on social drinkers scores were found to decrease as QPO increased (Hannon, et al., 1983; Macvane, et al., 1982; Parker & Noble, 1977).

In addition, alcoholics have been found to be impaired on tests of learning and memory and perceptual-motor skills (Parsons & Leber, 1981). It was on tests of perceptual-motor skills, as well as abstraction/problem-solving, that Schaeffer et al. (1984) found

differences between nonalcoholics with positive and negative family histories of alcoholism. Thus, future studies may find significant results by using a wider variety and more sensitive test measures.

In the present study, the interaction between level of social drinking and family history of alcoholism did not add significantly to the variance accounted for by the effects of vocabulary, level of social drinking, and family history of alcoholism. This is in agreement with Schaeffer et al.'s (1984) finding that alcoholism and family history exerted independent effects on neuropsychological test performance. However, the present findings conflict with Schaeffer et al.'s in that, in non-alcoholics, family history of alcoholism was not found to account for performance on a test of abstraction ability. One reason for this discrepancy may have been in the tests used. Schaeffer et al. used a cluster of abstraction/problem-solving tests including the SILS abstraction scale, the Conceptual Level Analogy Test, Levine's hypothesis testing procedure, and the Booklet Category Test. Their measures of abstraction ability were thus more sensitive to the types of impairments usually observed in alcoholics. It is expected that if family history exerts an influence on cognitive functioning, it will be in such areas. Indeed, Goodwin (1983) showed that adopted nonalcoholic sons of alcoholics performed poorly on the Halstead Category Test when compared to sons of non-alcoholics. As mentioned above, the SILS may not be an adequate measure to detect these differences.

An alternative explanation for the absence of a family history main effect is that the definition of family history may have been too broad. In the present study, a participant was defined as having a positive family history if anyone in his immediate family, including siblings, were alcoholic. The same classification was used in the Schaeffer et al. study. It is possible that a family history effect may have been found in the present study if family history had been defined more narrowly as having an alcoholic parent. This definition would at least be justified by the studies showing neuroanatomical differences between alcoholics with FH+ versus FH- alcoholics (Begleiter et al., 1982).

Even if family history was found to affect cognitive functioning, the conclusions would not be clear. Any effect found could be due to a third factor. For example, persons who have an alcoholic member in their immediate families likely experience unique stressors. These stressors themselves may affect cognitive functioning. Thus, it could not be concluded that persons with positive family histories of alcoholism perform more poorly than those with negative histories due to neuroanatomical differences. Past studies have supported that there are neuroanatomical differences between FH+ and FH- alcoholics (Begleiter et al., 1982). However, the same difference is still to be investigated in nonalcoholics. The possibility that these differences exist has been suggested by Schuckit and Duby (1982). They found that nonalcoholic males with positive family histories exhibited greater facial flushing in response to alcohol ingestion that nonalcoholic males with no alcoholic family members. It would be

beneficial for future studies to include measures of neuroanatomical differences, such at CT scans.

A final explanation for the non-significant findings in the present study may have been the fact that the alcohol use questionnaire concerned an average drinking pattern over the past 6 months. It did not request information concerning drinking in the week prior to testing. In fact, participants were requested to abstain from drinking alcohol for 24 hours prior to testing. Bergman (1985) showed that in a sample of male social drinkers, morphological cerebral changes and impairment on cognitive tests were not related to QPO in the 6 months prior to testing. However, morphological cerebral change and cognitive impairment were negatively affected by a high amount of alcohol consumption in the week prior to testing, regardless of QPO. This suggests that averaging alcohol consumption over the past 6 months may have masked differences that may have appeared with consumption over the prior week.

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Appendix A

Alcohol Use Questionnaire

Age: _____
Sex: _____

1. During the past six months, how often did you have wine?

   1 = Daily
   2 = Five or Six days a week
   3 = Three or four days a week
   4 = One or two days a week
   5 = Three times a month or fewer
   6 = No wine in the past six months

2. During the past six months, about how much wine did you drink in a typical day in which you drank wine?

   1 = 5 fifths or more
   2 = 3 to 4 fifths
   3 = 2 fifths
   4 = 1 fifth
   5 = 2 water glasses or 3 to 5 wine glasses
   6 = 1 water glass or 1 to 2 wine glasses
   7 = none

3. During the past six months, how often did you have beer?

   1 = Daily
   2 = Five or six days a week
   3 = Three or four days a week
   4 = One or two days a week
   5 = Three time a month
   6 = No beer in past six months

4.   During the past six months, how much beer did you drink in a typical day in which you drank beer?

1 = 6 quarts or more

2 = 5 quarts
3 = 4 quarts
4 = 3 quarts
5 = 1 to 2 quarts
6 = 1 to 3 glasses
7 = none

5.   During the past six months, how often did you have drinks containing whiskey or liquor?

1 = Daily
2 = Five or six days a week
3 = Three or four days a week
4 = One or two days a week
5 = three times a month or fewer
6 = no liquor in the past six months

6.   During the past six months, about how much whiskey or liquor did you drink in a typical day in which you drank liquor? (1 pint = 16 oz. or just over ten 1 1/2 oz. shots; 2 pints = 1 quart; fifth = 25.6 oz.)

1 = 4 pints or more
2 = 3 pints
3 = 2 pints
4 = 1 pint
5 = 8 to 10 shots or drinks
6 = 3 to 7 shots or drinks
7 = 3 to 4 shots or drinks
8 = 1 to 2 shots or drinks
9 = none

7. During the past six months, how often did you have any kind of beverage containing alcohol, whether it was wine, beer, whiskey, or any other drink?

    1 = Three or more times a day
    2 = Twice a day
    3 = Every day or nearly every day
    4 = Three or four days a week
    5 = One or two days a week
    6 = Two or three time a month
    7 = About once a month
    8 = Less than one a month, but at least once
    9 = No beverages containing alcohol in the past six months

8. When you drink alcoholic beverages, how often have you had as many as five or six drinks?

    1 = Nearly every time
    2 = More than half the time
    3 = Less than have the time
    4 = Once in a while
    5 = Never

9. When you drink alcoholic beverages, how often do you have three or four drinks and no more?

    1 = Nearly every time
    2 = More than half the time
    3 = Less than half the time
    4 = Once in a while
    5 = Never

10. When you drink alcoholic beverages, how often do you have one or two drinks and no more?

    1 = Nearly every time
    2 = More than half the time
    3 = Less than half the time
    4 = Once in a while
    5 = Never

11. During the past six months, on drinking days, how much did you typically consume?

Beer_____ Wine_____ Liquor_____

12. During the past six months, what is the most you drank in any 24-hour period?

Beer_____ Wine_____ Liquor_____

13. How many times in the past six months did you drink that much?

Appendix B

Family History Check List

Please indicate with a ( ) which of the following family members have or have had in the past any of the following alcohol-related symptoms. If a particular symptom does not apply to a family member, then leave it blank. On a other hand, if you are simply not sure about a particular family member, please a DK (don't know) in the blank.

	Mother	Father	Brother	Sister
4 drinks per day or 30 per week	_____	_____	_____	_____
Suffered any of the following as a result of drinking:				
Problems in social relationships and/ or marriage	_____	_____	_____	_____
psychological problems causing them to enter treatment	_____	_____	_____	_____
problems on the job (missed days or fired)	_____	_____	_____	_____
physical symptoms such as shakes or nausea when they don't have alcohol for a period of time	_____	_____	_____	_____
Diagnosed as an alcoholic by a professional	_____	_____	_____	_____

Appendix C

Consent Form

I have been given instructions concerning the questionnaires which I am about to complete and I agree to participate. I understand that my participation is voluntary and that even after signing this form I may withdraw from the study at any time. I also understand that my answers will be seen only by the persons responsible for this project and that my name will be omitted from any results which are published or presented.

_____   _____

Signature   Date