THE EFFECTS OF EXERCISE ON ALCOHOL CONSUMPTION AND DEPRESSION IN DUI PROBATIONERS

by

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(ABSTRACT)

The subjects were DUI probationers placed by the court system in the Virginia Alcohol Safety Action Program (VASAP). Due to their high risk level, the subjects were placed in treatment programs. An exercise program was incorporated in a VASAP treatment program to investigate the reduction in alcohol drinking frequency and quantity by implementing a weekly questionnaire as a repeated measure in an experimental vs. a control group design.

Within these same groups, depression was measured through a pre-post design using the Beck Depression Inventory as a psychometric measure. The two arms of the study were evaluated by weekly ordinal data analyzed using a repeated measure ANOVA and a pre-post design using a 2x2 table with the appropriate ANOVA at a .05 level of significance.

The results indicated no significant difference between the groups. There experimental group established a reduction in alcohol consumption and depression at a faster rate than the control group.

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CHAPTER I

INTRODUCTION and STATEMENT of the PROBLEM

Probationers are individuals who have been convicted of driving-under-the-influence (DUIs) and sentenced to attend treatment groups for alcohol abuse. The risk for relapse is high among these individuals. Relapse may occur when the probationer does not have a constructive behavior to replace the behavior of drinking alcohol. Depression is a psychological correlate which has often been associated with alcoholic relapse. Because the *whole* individual who consumes alcohol is often described as unhealthy, then the *whole* individual needs to receive treatment. According to Murray (1986) the addition of exercise to a multidisciplinary modality reflects a holistic approach to the care of the alcoholic. "Proponents of holistic health define this approach as a system of preventive medicine that takes into account the whole individual and individuals' responsibility for their own well-being" (Murray, 1986, P. 30). Murray (1986) continues by reporting that treatment programs which used a holistic approach treat the "whole" person. In these programs, there is an attempt to instruct the patient to develop new thinking patterns, new behaviors, and therefore, a healthier lifestyle (Murray, 1986).

The current Virginia Alcohol Safety Action Program (VASAP) Substance Abuse Counseling (SAC) treatment group

educates the probationers on the importance of replacing prior drinking behaviors by implementing an event such as a bowling or a pizza party. Because of the number of subsequent DUIs received by probationers who attend the SAC treatment group, there appears to be a need for a therapeutic intervention that is more effective in replacing the drinking behavior.

In order to reduce subsequent DUIs, probationers need to be able to replace their drinking behavior with a more constructive behavior. Murray (1986) reports numerous alcohol studies in which the results indicated exercise as a positive deterrent for the drinking behavior. Barnes (1979) describes the alcoholic as a depressed individual, and Brandon and Loftin (1991) report that exercise reduces depression; therefore, it follows that depression needs to be evaluated in this study in conjunction with reporting the DUI probationer's frequency and amount of alcohol consumed weekly.

Statement of the Problem

Murray (1986) reports that treatment facilities were incorporating a fitness component in the multidisciplinary treatment programs as a means of improving subsequent abstinence rates and alleviating symptoms associated with depression. The currently implemented

psycho-social-educational SAC group educates the probationer as to the consequences of continued alcohol usage and increases the individual's heightened insight or awareness concerning his continuing alcohol consumption. In conjunction with this education, the probationers are taught how to discuss their daily problems and reactions to these problems. This goal is accomplished through weekly discussion concerning their feelings and emotions. Through observation by a certified substance abuse counselor (CSAC), a vast majority of the expressed feelings and emotion consist of negative affect, such as, being sad, being anxious, being frightened or scared, or being depressed. According to Gorsky (1989), these problems, if left untreated increase the probability of a relapse. These probationers are at a high risk for relapse because they are depressed; which makes learning how to change their detrimental drinking behaviors to sober, healthier, constructive behaviors more difficult.

Purpose

The purpose of this study was to incorporate in the SAC group an exercise program in order to determine whether the behavior would decrease the amount and frequency of drinking within a population of DUI probationers. This study also evaluated the effects of exercise on depression as measured

by the Beck Depression Inventory (BDI) (Beck, Weissman, & Kovacs, 1976) among this population.

Design

Experiment one employs using a repeated measure comparing an experimental group, exercise group vs. a control group, weekly, over a ten week program. Experiment two is a pre-post design using the Beck Depression Inventory. The first group, the experimental group incorporated an experimental aerobic exercise program, as an intervention designed to change the probationer's behavior. The second group was conducted using the currently established SAC treatment program.

Exercise has been associated with reducing depression on psychometric measures (Brandon and Loftin, 1991). Therefore, a depression scale, the BDI, was also administered to both groups as a psychometric measure to evaluate the reduction of depression through exercise.

There were two dependent measures gathered from each group. The first was a self-report of the amount and frequency of alcohol consumed weekly. The second data set was a BDI score collected on the first session and from the last session.

Research Question

This study contains two research questions. First, does an exercise program decrease or eliminate the amount and frequency of alcohol consumed by DUI probationers in an out-patient setting? Second, was depression in these probationers be reduced as a product of the exercise program?

Summary

Research indicates that in treatment facilities, alcoholics need to be treated as whole individuals. Because not all alcoholics are capable of receiving inpatient treatment, there is a need to evaluate out-patient programs. DUI probationers are a specific population who may not be able to receive inpatient treatment, but need to be treated as a whole individual. The currently implemented outpatient treatment program (SAC) focuses on the psycho-social-educational components of alcoholism. However, this program does not physically instruct the probationers on avenues to change their drinking behavior to sober behaviors.

As the literature indicates, exercise programs have successfully deterred drinking behaviors in inpatient facilities. Therefore it is important to be able to reach the population of alcoholics who can not participate in inpatient programs with exercise programs incorporated in an outpatient setting. This study was designed to address this

important need for Dui probationers to be given the chance to physically learn how to change their destructive drinking behaviors to sober, healthier behaviors. An exercise program was incorporated in the current SAC treatment group, where alcohol drinking frequency and quantity were analyzed in a weekly questionnaire design using a repeated measure design.

Because depression has been used to describe alcoholics and exercise has been shown to decrease depression, then depression needs to be evaluated in this study. By using a pre-post design, and a psychometric measure, depression was evaluated in the SAC treatment group.

CHAPTER II

Literature Review

Alcoholism is a major health problem affecting the United States. Kissin (1977) reported that the traditional multidimensional treatment of alcoholism focuses on cognitive therapy or spiritual development usually through the Alcoholics Anonymous organization. Current research indicates the need for change to treat the alcoholics as a whole individual and integrate a process of healing which incorporates a wellness philosophy. In this review, there is a discussion of four different areas concerning exercise as a means of changing the alcoholics behavior. The approaches being reviewed are a holistic view, a fitness view, a depression view, and a view out side the addiction field.

Holistic

According to Glasser (1976), individuals are capable of becoming "addicted" to healthy behaviors, which produces many physical and mental benefits. Therefore, if an alcoholic can be taught to give up unhealthy behavior and replace behavior with a wellness behavior, the healthy behavior may provide a more productive lifestyle.

Ardell (1979) discussed wellness as "giving care to the physical self, using mind constructively, channeling stress energies positively, expressing emotions effectively,

becoming creatively involved with others, and staying in touch with the environment (p. 13). Dorland (1981) expanded the holistic approach to wellness by asserting that certain influences such as nutrition, exercise, and mental relaxation must be involved in a wellness program. In 1986, Murray reviewed the literature supporting the holistic view towards treating alcoholics. He discusses studies which suggest fitness programs be incorporated as an asset to multidisciplinary treatment programs aimed at changing the alcoholics behavior (Murray, 1986).

Fitness

Gary and Guthrie (1972) reported that "...poor physical fitness can be viewed both as a cause and as a result of alcoholic behavior, and increased physical fitness might be expected to improve self-regard and thereby reduce the pressure for continued drinking" (p. 1073). In their study, Gary and Guthrie (1972) established that alcoholics were able to improve their cardiovascular fitness during 20 days of exercise treatment. They continued by demonstrating that the most significant change in physical improvement was the decrease in the pulse rate from standing to post-exercise rates.

Joggotherapy was developed by Harper (1979) as a different type of therapy to aid a variety of problems, which included alcoholism. Because of jogging's addictive

nature, Harper reported that jogging could replace the negative addiction of alcoholism and improve general physical fitness (Harper, 1979).

In a study conducted through a mental hospital in Japan, Tsuke and Shohoji (1981) attempted to enhance the alcoholics' self-concept by increasing their physical fitness. To increase the physical fitness, Tsuke and Shohoji (1981) used movement therapy in the form of basketball skills. Tsuke and Shohoji (1981) report that there is a noticeable improvement in an alcoholics physical condition, particularly, coordination after the introduction of basketball skills. They demonstrated that a sports activity increases a patient's physical strength and agility (Tsuke and Shohoji, 1981).

Depression

What is depression?

There are many different psychological theories describing and defining depression. Seligman (1972) reported that when a person believes that he/she does not have control over their events, then hopelessness and depression result. From this learned helplessness theory, attributional theories of depression stated that along with the learned helplessness concept, events believed to be caused internally will result in lower self-esteem than the events believed to have external causes (Miller and Norman,

1979). Ledwidge (1980) defines depression as feelings of sadness and fear, without justification. The cause of these feelings is either apparent or not apparent to the sufferer; if apparent, then the intensity and duration of the distress is disproportionate (Ledwidge, 1980).

In 1989, Abramson, Metalsky, and Alloy developed a subtype of depression called hopelessness depression. This theory introduces hopelessness as a proximal sufficient cause of the symptoms of depression (Abramson et al., 1989). Brumback (1993) reported Hippocrates in the 4th century B.C. used the term melancholia to describe depression. Brumback (1993) noted a description of melancholia provided by Aretaeus of Cappodocia in the 2nd century A.D..

> "Those affected with melancholia are not everyone of them affected according to one particular form: they are either suspicious of poisoning or flee to the desert from misanthropy or turn superstitious or construct a hatred of life...the patients are dull or stern, dejected or unreasonably torpid without any manifest cause... they also become peevish, dispirited, sleepless, and start up from a disturbed sleep. Unreasonable fear also seizes them...they become thin by their agitation and loss of refreshing sleep... at a more advanced stage, they complain of a

thousand futilities and desire to die. "

(Brumback,1993,p. 79)

Brumback (1993) reported that the physiological symptoms of depression are more interesting than just the mood changes. Brumback (1993) demonstrated that the physiological symptoms suggest depression as an illness with profound effects on a variety of brain systems. He reports that lesions in the anterior parts of both hemispheres and the basal ganglia are more likely to produce depression (Brumback, 1993). Brumback (1993) describes the neurophysiologic changes which occur in depression. Sleep disturbances (delayed insomnia and frequent awakening) is the most extensively studied change (Brumback, 1993).

Brumback (1993) reports other neurophysiological changes which are somatic complaints, (i.e. headaches, abdominal pain, dizziness, vague aches and pains, and blurred vision), alimentary tract disturbance (eating disorder-increase in or loss of appetite-constipation), weight change (loss or gain), psychomotor disturbance (increased body activity; decreased body activity; increased or decreased mental activity-including impaired concentration and confusion), nonreactivity to surrounding events, altered sexual functioning (including loss of libido and change in menstrual function), and diurnal variation in mood and symptoms (worse in the morning).

After this brief overview of depression, alcoholics and depression must be addressed. Goldstein and Linden (1969), and Whitelock, Overall, and Patrick (1971) hypothesized that depression was a characteristic of a person hospitalized for alcohol abuse. Beck, Weissman,. and Kovacs (1976) also reported high levels of depression in alcoholics.

In Frankel and Murphy's (1974) study, their results supported the hypothesis concerning depression and alcohol abuse. The alcoholic inpatients were provided an exercise component which consisted of one hour sessions, five days a week, for 12 weeks (Frankel and Murphy, 1976). The specific results indicated that through a psychometric measure, the Minnesota Multiphasic Personality Inventory (MMPI) subtests, the patients showed a decrease in depression and blame-projection, which was correlated with increases in performance in physical fitness (Frankel and Murphy, 1976).

Because psychiatric pictures occur with substance abuse, Schuckit (1985) reports the importance of determining depression of primary or secondary illness in alcoholics. Schuckit (1985) determined that after a period of abstinence, the secondary illnesses may disappear. He explained that "sadness" is common after drinking and affective disorders can be seen in 50% or more alcoholics (Schuckit, 1985). If an alcoholic continues with heavy drinking, alcohol induced depression can be severe and last a extended period of time (Schuckit, 1985). In this case,

there may be enough symptomology to fulfill the criteria for a secondary major affective disorder (Schuckit, 1985).

Hesselbrock, Meyer, and Keener (1985) reported on the importance of lifetime psychopathology among alcoholics in hospitals. In their results, major depression and phobia were common psychopathologies reported among female alcoholics, whereas, male alcoholics reported antisocial personality (ASP) and substance-use disorder (Hesselbrock et al., 1985). Among women, most of the psychopathologies onset preceded alcohol abuse, however, in men, the psychopathology onset was subsequent to alcohol abuse with the exception of ASP and panic disorders (Hesselbrock et al., 1985).

In 1986, Schuckit, reported five factors which contribute the discrepancy between an affective disorder and alcoholism.

> "1) Alcohol can cause depressive symptoms in anyone, 2) signs of temporary serious depression can follow prolonged drinking, 3) drinking can escalate during primary affective episodes in some patients, especially during mania, 4) depressive symptoms and alcohol problems occur in other psychiatric disorders, and 5) a small proportion of patients have independent alcoholism and affective disorder" (Schuckit, 1986, pp. 142).

Schuckit (1986) reported that two or three drinks will have an effect on an individual's mood. When individuals drink, there is a rise in blood alcohol concentration (Schuckit, 1986). During this rise, the individual will feel happy or stimulated; however, as the level falls, these feelings change to sadness, depression, or irritability (Schuckit, 1986). Schuckit (1986) concluded by explaining that even small amounts of alcohol may cause temporary emotional changes.

Dackis, Gold, Pottash, and Sweeney (1986) evaluated untreated depression in alcoholics. They report that after two weeks of sobriety, without any antidepressants, 80% of the alcoholics with depression were no longer depressed according to the Research Diagnostic Criteria (Dackis et al., 1986). Dackis et al. (1986) discuss the idea that these recovered moods may have been caused by alcohol-induced, organic affective syndromes instead of major depression. Therefore, these alcoholics may have been depressed because of alcohol's depressing quality instead of being depressed prior to the onset of alcohol dependence.

Palmer, Vacc and Epstein (1988) supported Frankel and Murphy's (1976) results involving exercise and depression. They found that regular physical exercise is beneficial to alcoholic inpatient treatment programs (Palmer et al. 1988). Palmer et al (1988) administered the Zung Self-Rating Depression Scale (SDS) and the Speilberger State-Trait

Anxiety Inventory (STAI) to determine the level of depression at entry and discharge from treatment. "Alcoholics who participated in a mild exercise program while in treatment had better scores on the SDS (i.e. were less depressed) and the STAI (i.e. were less anxious) than were alcoholics in the non-exercise control group" (Palmer et. a., 1988, p. 420). Palmer et al. (1988) concluded that the patients who participated in the exercise program should be able to cope more successfully with life stresses after being discharged from the treatment program.

Heh, Overall, and Kaufman (1990) reported that up to 90% of alcoholics admitted to treatment facilities report depressive symptomology. After a few weeks of abstinence, some of the patients report a reduction in their depression (Heh et al., 1990). However, in some patients, without any affective disorder (DSM-III criteria not met), the depressive symptoms may continue for several months to years after sobriety has been maintained (Heh et al., 1990). Because depression may continue for an extended period of time, there is a strong need to help alcoholics learn how to change their drinking behaviors.

Outside the Addiction Field

There have been studies conducted which evaluate physical fitness and depression outside the addiction field. Because of the important results in these studies, it is

important to discuss these results as another means of substantiating the results in the addiction field. Greist, Klein, Eischens, Faris, Gurman, and Morgan (1979) used running in a pilot study as a possible treatment for alleviating depression. They concluded that running therapy could be thought of as a trained skill which would require practice and include a built-in positive reinforcement (Greist et al., 1979). The Greist et al. (1979) results indicated a significant improvement of depression. Greist et al. (1979) discussed the important issue that with running; the patient has a role in treating illness and maintaining health.

Ledwidge (1980) reports that exercise enhances an individual's self-esteem, which increases self-confidence. This increase in self-confidence results from two consequences of training (Ledwidge, 1980). First, there is the visual improvement of the person's body, as a result of his/her self-image (Ledwidge, 1980). Second, there is a sense of accomplishment when a person tackles a physical challenge (Ledwidge, 1980). Ledwidge (1980) reports that aerobic exercise alleviates anxiety and depression because endurance training lessens the biological response to physical stressors. In promoting aerobic exercise as a effective means to alleviate depression, Ledwidge stated,

> "Aerobic exercise has several advantages over drugs, psychotherapy, or change of life style: it is free; it can be done alone; it has no deleterious side effects (with the possible exception of jogger's knee!); it takes little time (8 minutes of running time 4 times a week), and it has one important beneficial side effect, physical fitness" (Ledwidge, 1980, p. 136).

Doyne, Chambless, and Beutler (1983) specifically evaluated aerobic exercise as a possible treatment for depressed women. The psychometric measures used in this study were the Beck Depression Inventory (BDI) and the Adjective Checklist which indicated significant improvement over baseline when the women were required to ride a stationary bicycle four times a week for six weeks (Doyne, Chambless, and Beutler, 1983). Doyne, Chambless, and Beutler (1983) reported a reduction in depression from aerobic exercise. In a three month follow-up, they determined treatment gains continue after discharge (Doyne, Chambless, and Beutler, 1983).

Brandon and Loftin (1991) conducted a study evaluating the relation of fitness to depression. The subjects were recreational cyclists and the dependent measures include bicycle riding and four psychometric; measures which included the short form BDI (Brandon and Loftin, 1991). The results indicated a significant correlation between physical

fitness and emotional health (Brandon and Loftin, 1991). Brandon and Loftin concluded that more sophisticated designs should be used to address this research issue.

Summary

The research indicates that physical exercise should be regarded as a possible treatment to change alcoholic behavior and decrease depression. This literature review dealt with four specific areas concerning exercise as a possible treatment component used in treatment settings. These areas consisted of a holistic view, a fitness view, a depression view, and a view outside the addiction field.

The holistic literature reports that alcoholics must receive treatment which encompasses all aspects of their lives. Exercise is currently being incorporated in alcohol wellness programs.

Fitness programs are being studied in inpatient alcohol settings. These studies report that exercise is an important factor in sobriety and abstinence. It is also important to note that alcoholics were capable of improving the physical fitness level through different forms of exercise.

Depression has two different major correlates; physical changes and emotional changes. These changes need to be evaluated in the addiction field and outside the addiction field. Physical exercise has become an important factor in

reducing depression in both alcoholic and non-alcoholic patients. Research indicates that individuals who participate in exercise programs, reduce their levels of depression and develop new skills to help maintain a lower level of depression.

CHAPTER III

Method

Introduction

In the method section which follows, there will be first, a description of the subjects used in this study. Second, the dependent measures will be discussed. Next, the procedures of the study will be introduced. The analysis of data will be the final subsection discussed, and will be followed by a summary.

Subjects

The subjects were male or female referrals from the Salem and Roanoke, Virginia VASAP office. These subjects were probationers who had received a DUI and were referred from the court system to the VASAP program. The age range was from 19 to 53. Probationers were referred to the SAC treatment group by one or more criteria. The criteria were the following:

1. Probationer had received prior treatment for alcohol or drugs;
2. Probationer had received a prior DUI charge within the last 10 years;
3. Probationer had self admitted current (last 6 months) drug and alcohol usage; and

4. Probationer had reported a high (above .15) blood alcohol content (BAC) level (Lanter, 1989).

Subjects were assigned to the groups by means of each probationer's choice. During the initial in-take procedure for the SAC treatment group, each probationer had the choice of groups he/she would like to participate in for his program. The exercise program group was the experimental group. Probationers had a choice to be a member of the control group, or choose another group.

Dependant Measures

A questionnaire was developed for self-reporting the quantity and frequency of alcohol consumed weekly by the probationers. This questionnaire was administered weekly throughout the ten week program.

In estimating fitness levels, physical condition was be monitored by the subject's resting heart rate and pulse rate during each aerobic activity. Intensity level was determined by computing a heart-rate range for each subject between 60 and 80% of his estimated maximum heart rate. The maximum heart rate was derived by subtracting the subject's age from a maximum heart rate of 220 (Falls and Baylor, 1980). Each subject was trained by a certified aerobic instructor, hired to conduct the exercise component of the study, to monitor his/her own intensity level.

The Beck Depression Inventory (BDI) was selected as the psychometric instrument used to measure the level of depression (Beck et al., 1976; Beck, Steer, and Garbin, 1988). Beck et al. (1988) reported the internal consistency rated by Cronbach's alpha coefficient for 25 studies ranged from .73 to .95. Beck et al. (1988) continued by explaining the mean coefficient alphas for the nine psychiatric populations was .86 and .81 for the 15 non-psychiatric populations. Beck et al. (1988) reported that the content validity, when compared to the American Psychiatric Association's Diagnostic and Statistical Manual on Mental Disorders (DSM-III), reflects six of the nine criteria.

In discussing stability, Beck et al. (1988) reported that the range of Pearson product-moment correlations for the non-psychiatric samples ranged from .60 to .83. Where as the psychiatric samples had correlations from .48 to .86 in test-retest studies. "The BDI is a 21-item self-report inventory that covers a wide range of symptoms associated with depression; these symptoms cover affective, cognitive, motivational, and vegetative signs of depression " (Steer, McElroy, and Beck, 1983). Because of it's ease of administration and the suitable estimates of reliability and validity, the BDI was chosen over other psychometric measures.

Procedures

The design of the study incorporated two experimental arms. The first experiment employed using a weekly questionnaire as a repeated measure comparing the two groups (Appendix A). The second experiment implemented a psychometric measure administered as a pre-post design in each group. Both groups attended a once a week SAC treatment session. Both groups received the educational aspect of the SAC treatment group taught by a CSAC counselor. Prior to the first session, a health questionnaire was be sent to the members of the experimental group which incorporated an exercise program (Appendix B). This questionnaire was mailed with a stamped self-addressed envelope to be returned before they begin the sessions. The experimental group was also asked to complete two informed consent forms (Appendix C and Appendix D). Appendix E contains an outline for the 10 weeks of education taught by the instructor.

Each subject in the experimental group participated in one session per week, for 10 weeks, SAC treatment group. The first hour of each session involved alcohol and drug education instructed by the same certified substance abuse counselor. The second hour involved an aerobic fitness component, which incorporated a warm-up period, a low impact aerobic period, and a cool-down period. The fitness component instructed by a certified aerobic instructor hired

specifically for this task. The instructor trained each subject to monitor his/her own heart rate. The heart rates were recorded each session.

The BDI (Appendix F) was be administered to both experimental groups prior to first session and again upon completion of the final session. Each subject in both groups was requested to complete weekly questionnaires (Appendix D) concerning the amount and frequency of alcohol consumed during the week. Therefore, 10 questionnaires were completed by each subject in both the experimental and control group. Both groups received weekly breath tests with a calibrated breathalizer following the completion of the weekly questionnaires. This procedure was necessary to monitor the honesty of each subject concerning his/her alcohol usage.

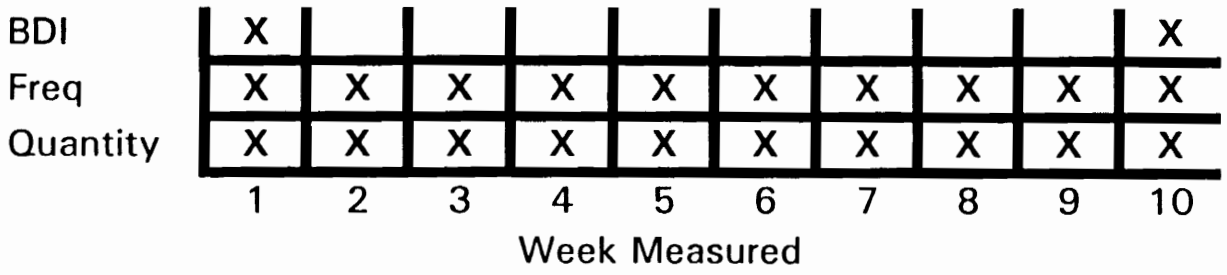
Analysis of Data

The data for this study was analyzed by two different measures. A .05 level of significance was employed in both arms of the study.

In Experiment I, a weekly questionnaire was employed to be filled out by each subject. This questionnaire measured the frequency and quantity of alcohol consumed. This questionnaire yielded weekly ordinal data which was analyzed using a repeated measure ANOVA (Table 1).

Table 1. Schematic of experimental design

DEPENDENT MEASURES



The second experiment measured the BDI, which was administered during the first and last sessions (see Table 1). This data was cast on a 2x2 table and a repeated measure ANOVA was employed.

Summary

In this section, the subjects, dependent measures, procedures, and analysis have been discussed. This study was comprised of two experiments.

The first was a repeated measure experimental vs. control group design. The second was a pre-post design for the same groups. The experimental group received an independent variable consisting of aerobic exercise in conjunction with alcohol education. The second group received solely the alcohol education. Alcohol quantity and frequency were used as the dependent variable in experiment one. Depression as measured by the BDI, was used as the dependent variable in experiment two.

Chapter IV

Introduction

The results are described below with an explanation of how the data was obtained. The data is discussed first, by the drinking pattern between groups and, secondly, by the levels of depression in the probationers.

Results

The experimental group began with 20 subjects. Six members were dropped because they failed to begin the group. Three members had to change to a different SAC treatment group because of a change in employment hours. The experimental group ended the tenth session with 11 members (group 1:n=11). The control group began with 12 members. Two members produced positive BAC levels and were returned to the court system. Two other members were declared habitual offenders and dropped from the group by their own accord. The control group ended it's tenth session with eight members (group 2:n=8).

The data was collected by scoring the weekly questionnaires and BDI as follows. The weekly questionnaires (Appendix A) were scored by questions one and three ranging from zero to five. If no alcohol was reported, then the probationer received a zero score. Questions two and four were scored as follows; no=2, yes=0,

same=1. The BDI was administered in the first and last sessions. Therefore, a pre-post score was obtained from each probationer. A repeated measures ANOVA was applied to both data sets.

No significant difference between the experimental and control group was found (Table 2) when evaluating drinking frequency and quantity. The F-ratio indicated the probability of attaining a F-ratio of 1.61 by chance alone, occurs only 12 times in 100. This indicates that the groups were somewhat different, although given the fact of small groups, further investigation is needed. Even though the groups are not significantly different, over time, both groups reduced their drinking patterns. The data in Figure 1 shows the decrease in alcohol frequency and quantity of both groups over the ten week session. Group one drank less and reached no alcohol consumed two weeks prior to group two.

The data in experiment two, Table 3 indicates that there was significant interaction affect between the experimental and control group when evaluating depression in DUI probationers. Cut-off scores on the BDI are as follows: 0-9 are considered in the normal range; 10-18 indicate mild-moderate depression; 19-29 indicate severe depression; and 30-63 indicate extremely severe depression (Beck and Steer, 1987).

TABLE 2

Drinking Patterns Between Groups

Source	DF	Sum-Squares	Mean Square	F-Ratio	Prob>F	Error
A(Group)	1	151.5826	151.5826	2.45	0.1362	S(A)
S(A)	17	1053.091	61.94653			none
B	9	420.5053	46.72281	6.24	0.0000	ERROR
AB	9	108.5357	12.05952	1.61	0.1169	ERROR
ERROR	153	1146.159	7.491236			
TOTAL (ADJ)	189	2879.874				

Level of significance=.05

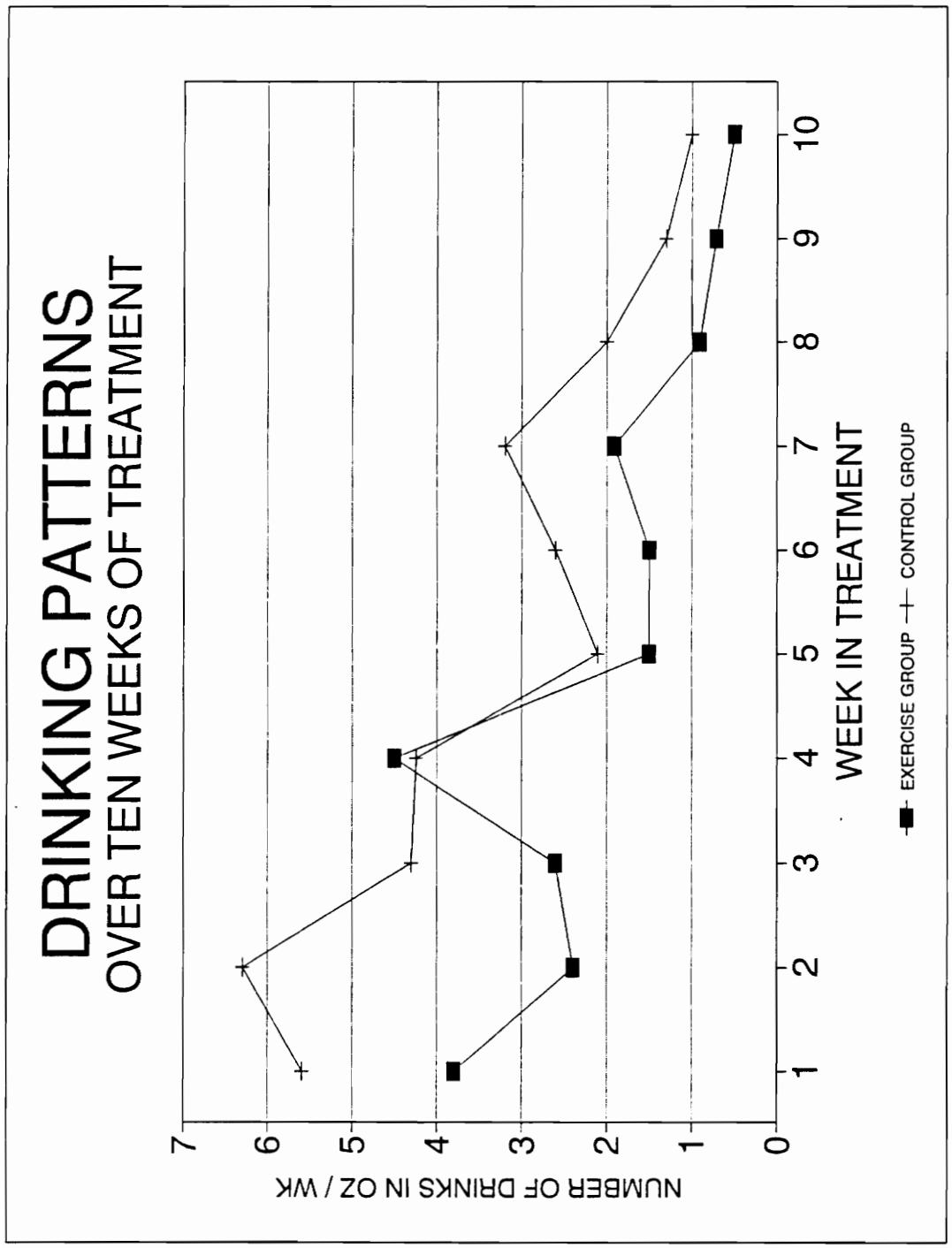

DRINKING PATTERNS
OVER TEN WEEKS OF TREATMENT
NUMBER OF DRINKS IN OZ / WK
0
1
2
3
4
5
6
7
1
2
3
4
5
6
7
8
9
10
WEEK IN TREATMENT
EXERCISE GROUP
CONTROL GROUP

TABLE 3

Prevalence of Depression in DUI probationers
Using the Beck Depression Inventory

SOURCE	DF	SUM-SQUARES	MEAN SQUARE	F-RATION	PROB>F	ERROR
A(Group)	1	35.38741	35.38741	0.57	0.4591	S(A)
S(A)	17	1048.455	61.6738			none
B	1	306.9474	306.9474	12.78	0.0023	ERROR
AB	1	25.84804	25.84804	1.08	0.3140	ERROR
ERROR	17	408.2047	24.01204			
TOTAL	37	1824.842				

Level of significance=.05

However, the information displayed in Figure 2 depicts the decrease in depression within each group. The experimental group scored in the mild to moderate range in the pre-treatment test; then scored substantially lower in the normal range after the treatment (exercise) was administered. There was a seven point difference in depression from the pre vs the post treatment.

The control group scored in the normal range during the first session. Yet, this groups depression decreased by four points during the final session.

Equally important as the data were the comments made by the exercise members. During the tenth session, the members comments concerning the exercise portion of the class, as it related to changing their addictive behaviors, were hand recorded.

Summary

In this section, the results from both arms of the study were discussed. First, the drinking patterns between the groups through the use of a repeated measure ANOVA table were described and shown. Second, the levels of depression among the subjects were also reported in an ANOVA table. Both ANOVAs were run at a .05 level of significance.

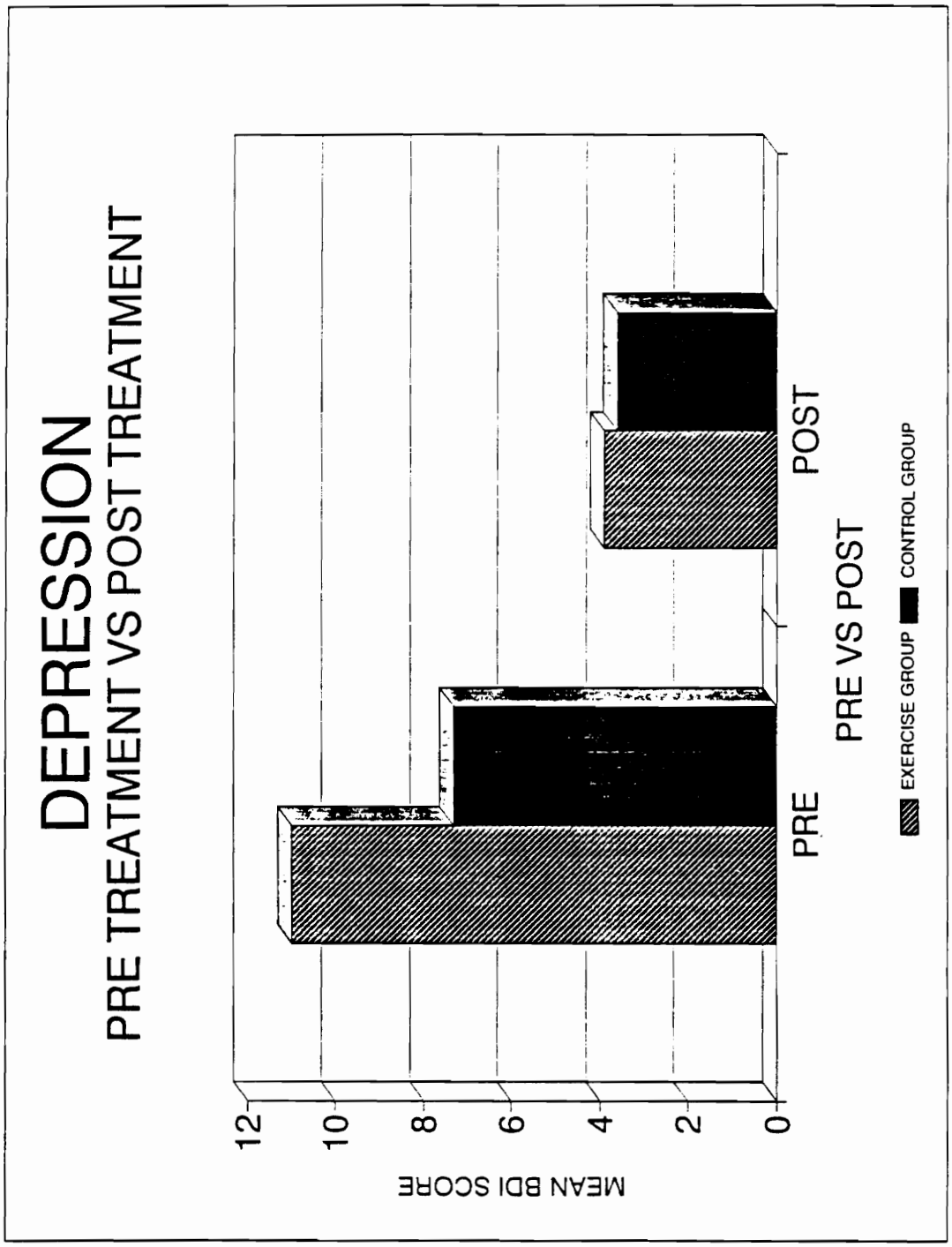


Figure 2-Depression levels measured between each group in pre vs. post treatment

Chapter V

Summary

The effects of exercise on alcohol consumption and depression were investigated through a two arm study. An exercise program was incorporated in VASAP SAC treatment program. The first arm of the study implemented a weekly questionnaire concerning the frequency and quantity of alcohol consumed by DUI probationers. The second arm evaluated the levels of depression through a pre-post design implementing the BDI as a psychometric measure.

The results of both arms were evaluated by an ANOVA statistical measure. The first arm used a repeated measure ANOVA. The second arm enlisted a pre-post ANOVA. The conclusions an recommendations from this study are presented below.

Conclusion

The exercise group data supported the literature concerning alcohol reduction through the use of an exercise program. The data reported does not indicate any significant difference between the groups. Even though no significant difference was found between the drinking patterns of the group, each group reduced their alcohol consumption.

It is important to note that when evaluating the groups by weekly sessions, the exercise group reduced their alcohol consumption substantially by week number five. The control group never reached the same reduction in the alcohol level as the exercise group. The control group continuously consumed more alcohol throughout the entire ten weeks. Therefore, the exercise program produced some positive results in the experimental group which did not show up in the control group. The experimental group showed a faster rate of alcohol reduction or abstinence.

It is important to note that both groups reduced their levels of depression. However, when evaluating depression, the exercise group reduced their depression by more points than the control group. Also, there is a substantial difference in the mean scores between the two groups. The results indicate that depression was reduced in both groups, with the experimental group showing a large point spread from the pre to the post treatment. Therefore, as the literature indicates, the exercise program did reduce the level of depression as shown through the BDI.

Some of the members had been through in-patient or other VASAP programs previously. Ten out of eleven members stated during the final session that they learned how to change their behaviors, not just talk about changing the behaviors. One member reported learning more through the group discussions than through the exercise program.

Those who had been through other programs reported a positive change in the self-esteem and behaviors. They continued by explaining the other programs did not help them learn how to change their behaviors. All eleven members reported a substantial change in their personality to cause them to want to stop or reduce their alcohol consumption. This "change in personality" may account for the reduction in the depression scale.

The probationers also reported an increase in their self-image. They reported feeling better about themselves and stated they thought they had accomplished a specific task. Accomplishing a specific task was reported by the probationers as an event which seldom ended in positive results like this exercise task produced.

Recommendations

Because of the number of deaths by drunk drivers, there is a need for some type of rehabilitation for the probationers who received DUIs. Many probationers are unable to financially provide for an in-patient treatment program. Therefore, the out-patient treatment programs need to encompass all aspects of treatment that an in-patient program would provide.

As indicated, exercise programs have been successfully implemented in-patient programs in aiding alcoholics to maintain a sober lifestyle. Because probationers who are

sent to VASAP treatment programs are in a high risk category, for subsequent DUIs or continued alcohol abuse, these individuals need to receive additional holistic, interventions like the exercise program. The probationers reported a positive change in themselves through the addition of the exercise program and the data indicated alcohol reduction. Therefore, implementing an exercise program with the VASAP treatment group would benefit the probationers. Also, the hourly length of the group would need to be increased from two hours to two and one-half hours or three hours. Because of the small sample size, replication is called for. This study needs to be replicated in with different treatment groups.

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Appendix A
Weekly Alcohol Consumption

Please check the one that applies to you for the previous week.

1. How many one ounce alcohol drinks did you consume this past week? (Remember: 1 ounce equals = 12 oz. beer; 1.5 oz. liquor; or 6-8 oz. wine)

A.___ = 0

B.___ = 1-2

C.___ = 3-4

D.___ = 5-6

E.___ = 7-8

F.___ = more than 8

2. Is this a reduction from the previous week?

Yes____ No____ Same____

3. How many days/evenings did you drink alcohol for the past week?

A.___ = 0 days

B.___ = 1 day

C.___ = 2 days

D.___ = 3 days

E.___ = 4 days

F.___ = 5 or more days

4. Is this a reduction from the previous week?

Yes____ No____ Same____

Please write your name and social security number

_____ __ __ __ - __ __ - __ __ __ __

Appendix B

PLEASE COMPLETE THE FOLLOWING MEDICAL QUESTIONS AND RETURN TO ME IN THE ENCLOSED, ADDRESSED, STAMPED ENVELOPE **BEFORE** YOUR SAC TREATMENT GROUP BEGINS. PLEASE REMEMBER ALL INFORMATION IS CONFIDENTIAL.

1. DATE OF LAST PHYSICAL EXAMINATION _____
(please include the year of your examination)

2. NAME OF PHYSICIAN WHO COMPLETED THE EXAMINATION _____

3. IF YOU HAVE NOT HAD A PHYSICAL EXAMINATION WITHIN THE PAST 12 MONTHS, PLEASE ANSWER ONE OF THE FOLLOWING:
   a. ____ I WILL BE WILLING TO HAVE A PHYSICAL EXAMINATION AT MY OWN EXPENSE.
   b.____ FOR OTHER REASONS, I AM NOT WILLING TO HAVE A PHYSICAL EXAMINATION.

4. DO YOU SMOKE CIGARETTES? YES_____ NO____ IF YES, HOW MANY?__

5. HOW MANY ALCOHOLIC DRINKS DO YOU CONSUME PER WEEK?
   a. NONE____ 26-30____
   1-15____ 31-35____
   16-25___ 36-more___
   b. HAVE YOU USED ANY MARIJUANA, COCAINE, NARCOTICS, OR OTHER DRUGS IN THE PAST 12 MONTHS? YES ____ NO ____
   c. IF YES, WHAT DRUGS WERE YOU USING? _____

6. HAVE YOU HAD ANY OF THE MEDICAL CONDITIONS LISTED BELOW?

a. AIDS, HIV	YES___ NO___	b. HEART DISEASE OR ATTACK	YES___ NO__
c. ALCOHOLISM	YES ___ NO___	d. HIGH BLOOD PRESSURE	YES___ NO__
e. DRUG ABUSE	YES___ NO___	f. KIDNEY DISEASE OR STONE	YES___ NO__
g. ASTHMA	YES___ NO___	h. LIVER DISORDER: HEPATITIS CIRRHOSIS	YES___ NO_
i. CANCER, OR LEUKEMIA	YES___ NO___	j. LUNG DISORDERS, INCLUDING EMPHSEMA	YES___ NO_
k. COLITIS	YES___ NO___	m. GALLBLADDER	YES___ NO_
l. SEIZURES	YES___ NO___		

I WANT TO THANK YOU FOR TAKING THE TIME TO ANSWER THE ABOVE QUESTIONS. PLEASE SIGN YOUR NAME, DATE, AND SOCIAL SECURITY NUMBER. I WILL SEE YOU IN GROUP SOON.

NAME _____ DATE _____
PRINT NAME _____
SOCIAL SECURITY NUMBER __ __ __ - __ __ - __ __ __ __

Appendix C

Division of Health and Physical Education
Virginia Polytechnic Institute and State University

INFORMED CONSENT

I,_____, do hereby voluntarily agree and consent to participate in a research project conducted by Susanna D. Craig (Young) of the Division of Health and Physical Education of Virginia Polytechnic Institute and State University.

Title of Study:
The effects of exercise on alcohol consumption and depression in Dui probationers.

The purpose of this experiment is to determine if an exercise program will make it easier to change drinking habits and reduce depression.

I voluntarily agree to participate in this research study. It is my understanding that my participation will include attending the SAC treatment group each Saturday morning. This group is comprised of an educational section, which is followed by the low-impact exercise section. Before you begin the first session, you will fill out a Beck Depression Inventory. After your final group, you will fill out this Inventory again. Next, there will be weekly questionnaires concerning your alcohol consumption for the previous week. You will be instructed, by a certified aerobic instructor, in the monitoring of your heart rate. The instructor will check to make sure you are taking your heart rate correctly.

This experiment may produce certain discomforts and risks. These discomforts and risks include physical pain or discomfort from exercising unused muscle groups. Death as a risk factor is being minimized by the use of a certified aerobic instructor. This instructor is aware of your fitness level. He/she will also teach you how to self monitor your heart rate. He/she will also incorporate low-impact exercises in the class. If you reduce your alcohol consumption, there may or may not be a period of sleep difficulties, irritability, tremors, jumbled emotions and craving for sweets. Also, reducing your alcohol consumption and increasing the time you exercise may cause you to loose weight.

Personal benefits that may also be expected by participating in this experiment are:

Drinking less and increasing your exercise, managing periods of depression, and learning about alcohol and drug usage.

I understand that there may be one or more appropriate alternative procedures that might be advantageous to me. These include:

1. Choosing a different SAC treatment group, without the exercise program.

Any data of a personal nature will be held confidential by the use of your client number assigned to your file. Susanna D. Craig (Young) and the aerobic instructor will be the only individuals who have access to your file and information will be used for research purposes only. I also understand that these data may only be used when not identifiable with me.

I understand that I may abstain from participation in any part of the experiment or withdraw from the experiment should I feel the activities might be injurious to my health. The experimenter may also terminate my participation should she feel that the activities might be injurious to my health.

I understand that it is my personal responsibility to advise the researchers of any preexisting medical problem that may affect my participation or of any medical problems that might arise in the course of this experiment and that no medical treatment or compensation is available if injury is suffered as a result of this research. A telephone is available which would be used to call the local hospital for emergency service.

I have read the above statements and have had the opportunity to ask questions. I understand that the researchers will, at any time, answer my inquiries concerning the procedures used in this experiment.

Date_____ Time_____
a.m./p.m.

Participant signature_____

Witness _____

HPE Human Subject Chairman Dr. E. Holford Telephone (703)231-7543

To receive the results of this investigation, please indicate this choice by marking in the appropriate space provided below. A copy will then be distributed to you as soon as the results are made available by the investigator. Thank you for making this important contribution.

_____ I request a copy of the results of this study.

Should I have questions about this research or conduct of this research, I may contact:

Susanna D. Craig Young Telephone 344-4339

Margaret Driscoll (703)231-7278

Janet Johnson (703)231-6077
Chair, IRB

Appendix D

WARNING, RELEASE, ASSUMPTION OF RISK, AND AGREEMENT TO HOLD HARMLESS

I am aware that participation in any sport can be a dangerous activity involving **many risks of injury.** I understand that the dangers and risk of participating in the Substance Abuse Counseling (SAC) Treatment\Low-Impact Aerobic Group include, but are not limited to, death, serious neck and spinal injuries which may result in complete or partial paralysis, brain damage, serious injury to virtually all internal organs, serious injury to virtually all bones, joints, ligaments, muscles, tendons, and other aspects of the muscular skeletal system, and serious injury or impairment to other aspects of my body, general health and well-being. I understand that the dangers and risks of participating in the above group may result not only in serious injury, but in a serious impairment of my future abilities to earn a living, to engage in other business, social and recreational activities, and generally to enjoy life.

In consideration of Psychological and Counseling Services and Debra A. Wheeler (aerobic instructor) permitting me to participate in the SAC Treatment\Low-Impact Aerobic Group, I hereby assume all the risks associated with participation and agree to hold Psychological and Counseling Services, its employees, agents, representatives, and volunteers harmless from any and all liability, actions, causes of action, debts, claims, or demands of any kind and nature whatsoever which may arise by or in connection with my participation of the above named group. The terms hereof shall serve as a release and assumption of risk for my heirs, estate executor, administrator, assignees, and members of my family.

Date:_____, 19

_____

(Signature of Participant)

Appendix E

Outline for Educational Component of the SAC Treatment Group

A. Session I

1. Introduction-welcome and orientation exercise; group rules; bac level explanations

2. Video - "Deadliest Weapon in America"

3. BDI administered

4. Closing

5. Implementation of "Feelings" homework to be brought in and discussed each week

B. Session 2

1. Video - "Chalk Talk"

2. Medical discussion concerning the effects of alcohol on the specific brain sections

3. Open discussion

4. Discussion of homework

C. Session 3

1. Video - "Choice of a Lifetime"; cocaine video

2. Lecture concerning the addiction to cocaine; cocaine's effects on the body and brain

3. Open discussion

4. Discussion of homework

D. Session 4

1. Video - "Three Headed Dragon"; video concerning feelings

2. Lecture and explaining concerning feelings and emotions effects on addictions

3. Open discussion

4. Discussion of homework

E. Session 5

1. Video - "Medical Aspects"; video dealing with alcohol and medical risks

2. Discuss hand-out (test) in conjunction with the video

3. Open discussion

4. Discussion of homework

F. Session 6

1. Video - "Marijuana and Human Physiology"

2. Lecture concerning the medical risks associated with marijuana usage

3. Open Discussion

4. Discussion of homework

G. Session 7

1. Video - "Drug Profiles"

2. Lecture incorporating all drugs, both legal and illegal which have not been discussed.

3. Open discussion

4. Discussion of homework

H. Session 8

1. Video - "Gratitude"

2. Open discussion concerning gratitude with group members

3. Discussion of homework

I. Session 9

1. Video - "Clean an Sober"

2. Pizza party while watching video

3. Discussion of video and homework

J. Session 10

1. Video - "Aftermath" - DUI video

2. Discussion of homework

3. Closure from the SAC treatment group

Appendix F

BDI

Date: _____

Name: _____ Marital Status: _____ Age: _____ Sex: _____

Occupation: _____ Education: _____

This questionnaire consists of 21 groups of statements. After reading each group of statements carefully, circle the number (0, 1, 2 or 3) next to the one statement in each group which **best** describes the way you have been feeling the **past week, including today.** If several statements within a group seem to apply equally well, circle each one. **Be sure to read all the statements in each group before making your choice.**

1
0 I do not feel sad.
1 I feel sad.
2 I am sad all the time and I can't snap out of it.
3 I am so sad or unhappy that I can't stand it.

2
0 I am not particularly discouraged about the future.
1 I feel discouraged about the future.
2 I feel I have nothing to look forward to.
3 I feel that the future is hopeless and that things cannot improve.

3
0 I do not feel like a failure.
1 I feel I have failed more than the average person.
2 As I look back on my life, all I can see is a lot of failures.
3 I feel I am a complete failure as a person.

4
0 I get as much satisfaction out of things as I used to.
1 I don't enjoy things the way I used to.
2 I don't get real satisfaction out of anything anymore.
3 I am dissatisfied or bored with everything.

5
0 I don't feel particularly guilty.
1 I feel guilty a good part of the time.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6
0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7
0 I don't feel disappointed in myself.
1 I am disappointed in myself.
2 I am disgusted with myself.
3 I hate myself.

8
0 I don't feel I am any worse than anybody else.
1 I am critical of myself for my weaknesses or mistakes.
2 I blame myself all the time for my faults.
3 I blame myself for everything bad that happens.

9
0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10
0 I don't cry any more than usual.
1 I cry more now than I used to.
2 I cry all the time now.
3 I used to be able to cry, but now I can't cry even though I want to.

11
0 I am no more irritated now than I ever am.
1 I get annoyed or irritated more easily than I used to.
2 I feel irritated all the time now.
3 I don't get irritated at all by the things that used to irritate me.

12
0 I have not lost interest in other people.
1 I am less interested in other people than I used to be.
2 I have lost most of my interest in other people.
3 I have lost all of my interest in other people.

13
0 I make decisions about as well as I ever could.
1 I put off making decisions more than I used to.
2 I have greater difficulty in making decisions than before.
3 I can't make decisions at all anymore.

_____ Subtotal Page 1 CONTINUED ON BACK

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14
0 I don't feel I look any worse than I used to.
1 I am worried that I am looking old or unattractive.
2 I feel that there are permanent changes in my appearance that make me look unattractive.
3 I believe that I look ugly.

15
0 I can work about as well as before.
1 It takes an extra effort to get started at doing something.
2 I have to push myself very hard to do anything.
3 I can't do any work at all.

16
0 I can sleep as well as usual.
1 I don't sleep as well as I used to.
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
3 I wake up several hours earlier than I used to and cannot get back to sleep.

17
0 I don't get more tired than usual.
1 I get tired more easily than I used to.
2 I get tired from doing almost anything.
3 I am too tired to do anything.

18
0 My appetite is no worse than usual.
1 My appetite is not as good as it used to be.
2 My appetite is much worse now.
3 I have no appetite at all anymore.

19
0 I haven't lost much weight, if any, lately.
1 I have lost more than 5 pounds.
2 I have lost more than 10 pounds.
3 I have lost more than 15 pounds.

I am purposely trying to lose weight by eating less. Yes _____ No _____

20
0 I am no more worried about my health than usual.
1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
2 I am very worried about physical problems and it's hard to think of much else.
3 I am so worried about my physical problems that I cannot think about anything else.

21
0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

_____ Subtotal Page 2

_____ Subtotal Page 1

_____ Total Score

VITA

Susanna D. Craig was born in Highland, Park Illinois on August 14, 1958. I attended Hollins College in 1976 and in 1980, I received my Bachelor's of Art degree with a major in psychology. August, 1989, I returned to Virginia Polytechnical Institution and State University to begin a Master's program in the College of Education, specifically, the sports management program.

From October, 1980 to September 1981 I was employed as a child care worker at the Lutheran Children's Home, Salem, Virginia. In November of 1981, I was a teller for the Third National Bank in Dayton, Ohio. I maintained the teller position until February, 1982. From September, 1982 to August, 1984, I was the office manager for Hollins Septic Tank. Then, I became self-employed as owner of Hollins Septic Inspections, from August 1984 through October, 1989. I joined Psychological and Counseling Services (PCS) on October, 1989 to currently as a Substance Abuse Counselor in Training. While employed with PCS, I began training as a Neuropsychological Technician in September, 1990, and received my Certified Substance Abuse Counselor (CSAC) license in April, 1993.

Susanna D. Craig