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# The Effects of Wellness Activity Choices on Urban Employees' Psychological Mood States and Job Satisfaction

Ruth Porter Holland  
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THE EFFECTS OF WELLNESS ACTIVITY CHOICES ON URBAN  
EMPLOYEES' PSYCHOLOGICAL MOOD STATES AND JOB SATISFACTION

by

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M.S.N. May 1976, University of Texas

B.S. January 1971, North Carolina Central University

A Dissertation Submitted to the Faculty of  
Old Dominion University in Partial Fulfillment  
of the Requirements for the Degree of

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URBAN SERVICES

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Donald Myers

Patrick K. Toy

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### **Abstract**

This ex-post-facto study was designed to examine the effects of varied levels of physical activity participation choices on employees' mood states and job satisfaction. A six (group) X two (sex) X three (times) ANCOVA method analyzed the relationship of three independent variables (group, sex and repeated exercise sessions) to ten dependent psychological measures (seven mood states and three job satisfaction components). Comparisons by group, sex, and time were made to determine whether four treatment groups of male and female employees who made choices to participate in varied levels of physical activity over an eight week period differed significantly from two control groups of male and female employees who made choices to maintain sedentary lifestyles over the same time period.

Subjects (N=108) completed a Physical Activity Index form (PAI) and three psychological measures: The Self Motivation Inventory (SMI); Profile of Mood States (POMS); and the Minnesota Satisfaction Questionnaire (MSQ). The SMI and PAI were completed initially for control purposes before the research period; SMI responses represented self-motivation scores and the PAI data grouped employees by levels of exercise participation, age, sex, height, and

weight and job position. POMS was used to obtain data for seven dependent psychological variables: Tension, Anxiety, Depression, Fatigue, Confusion, and Total Mood Disturbance Scores; the MSQ was used for three job satisfaction variables: internal, external, and general. Repeated analysis of covariance (ANCOVA) was conducted to determine the correlation between covariates (SMI scores, age, height, weight, job position) and each of the predicted ten dependent variables (seven mood states and three job satisfaction components).

Self-motivation was the single covariate that significantly correlated with the dependent variables. Controlling for self-motivation the main effect for group participation, sex, and time was analyzed by repeated one-way analysis (ANOVA) and the post hoc analysis of the Neuman-Keuls Multiple Range Test at the  $p < .05$  confidence level. Group, sex, and time interactive effects were conducted using the multivariate analysis (MANOVA). No significant sex main effect for any of the ten psychological variable analyses were indicated with F values ranging from  $P = .001$  for confusions, to  $P = .338$  for fatigue. Similarly, no significant interactive effects for group, sex, and time were found for any of the ten dependent psychological measures.

Significant group main effects were revealed for eight of the ten psychological variables: Tension, Depression, Anger, Vigor, Fatigue, Total Mood Disturbance, external and

general job satisfaction; while significant time effects were revealed for three psychological mood states: Depression, Tension, and Total Mood Disturbance Score. None of the three job satisfaction components were associated with the time variable. Overall results indicated that employees who participated in higher levels of physical activity had lower scores for negative psychological states: Tension, Depression, Anger, Fatigue, and Total Mood Disturbance Score. These same groups had higher scores for the positive psychological mood of Vigor and for external and general job satisfaction. Moreover, employees' Tension, Depression, and Total Mood Disturbance scores decreased as the time involved in the exercise participation sessions increased.

To my daughter Cyndi,  
To my family,  
and  
To "The Pre-School Integration Era" teachers and staff  
of Booker T. Washington High School  
Suffolk, Virginia  
Who gave the most caring, most effective, most lasting,  
and most valuable instructions

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## Chapter 1

### Introduction

Participation in wellness activities and exercise among the American adult population represents an eagerness to maintain and promote wellness health profiles. During the 1980s, urban communities throughout the United States experienced a fitness and wellness boom as attested to by the tremendous increase in dollars spent for exercise equipment, assessment efforts, and programs for participants (Feldman, 1984). However, reports show that exercise participants have consistently displayed conflicting behaviors. Much of the special exercise equipment, many of the clothes, and a large number of available exercise programs are not regularly used. Only 20 percent of exercisers actually work out sufficiently to realize the benefits of their fitness regimen (Feldman, 1984). Clearly, Americans have a fascination with wellness and physical fitness, but the interest appears to be more verbal than behavioral.

Hence, an escalating need exists to find effective ways to increase exercise participation among the urban adult population if national wellness and health goals are to be realized. During the past five years, only a moderate increase from seven to fourteen percent has occurred in the

public's participation in general types of wellness activity (DHHS, 1988). Progress has been a slow increase despite the known beneficial effects of wellness activity. Such exercise helps prevent disability, retards the onset of degenerative disorders associated with the aging process, and reduces health risk and stress related illnesses.

Hale (1983) cites evidence to support the prevalent belief that habitual exercise is beneficial to health and is a vital influence on the quality and length of an individual's life. Although many important questions remain, data of sufficient quality and quantity have concluded that regular exercise and wellness activity participation is a salubrious behavior.

The list of probable health gains from regular exercise participation is broad. These benefits include prevention of several of the leading causes of morbidity and mortality in the United States. As a result, the U.S. Public Health Service has identified initiation and maintenance of regular exercise as an area of major importance in the health status of the people of the United States (Johns and Basley, 1988).

Yet at any given time, approximately forty percent of American adults remain entirely sedentary. Another forty percent are inactive at levels too low for health and wellness gains, and only about twenty percent exercise regularly and intensively enough to meet wellness guidelines (Graham, 1983) or reduce risk for several chronic diseases



and premature deaths (Center, 1981).

Further available estimates indicate that about one-half of individuals who begin or renew a personal exercise program will fail to maintain it at a level required to produce desired effects, and a like proportion have failed in previous attempts. In the typical supervised exercise setting, about fifty percent of the participants will drop out of the program within six months to a year. Roughly, twenty to forty percent of employees eligible to use work site exercise facilities will do so, but only one-third to one-half of the users will exercise on a regular and vigorous basis (Powell and Paffenbarger, 1985).

In recent years, the worksite health promotion intervention model has emerged as a logical and popular approach to produce the widespread health wellness activity behavioral changes needed to increase exercise participation among the adult population. The focus is on all of the employees rather than a small group of highly motivated volunteers.

Results reveal that even modest health promotion programs have substantially reduced medical costs and care, and contributed to health wellness. For example, a health insurance plan study (Bly, et al., 1986) concluded that participants who maintained higher levels of physical fitness also experienced more positive moods and attitudes toward work. Participating employees also tended to have

lower medical claims. An estimated reduction of at least 30 million medical claims a year would be expected if all adults aged 20 to 69 attained at least average fitness through some form of regular exercise.

School and college personnel (DHHS, 1982) have reported substantial benefit from workplace wellness activity programs. The Dallas Independent School District saved nearly half a million dollars in substitute teacher fees due to a 35 percent drop in absenteeism following implementation of a wellness exercise program. In contrast, most educational school systems spend millions of dollars on substitute teacher fees each year, and one urban Virginia County spent 3.3 million dollars on such fees in 1978-79.

Few rigorous studies have evaluated the effectiveness of worksite programs either to increase significantly the total numbers of adults who exercise or to improve regular exercise adherence rates. The few worksite studies available have been limited to small groups of highly motivated employees who desired to maintain high physical fitness levels or to modify health risks conditions such as overweight and cigarette smoking.

Such research efforts have been of use in evaluating the effects of regular wellness activity through exercise participation on associated changes in physical health indicators, but these investigations have been of little value in determining a set of psychological changes and

their relationship to regular exercise participation. Even a lesser number has examined the rate of compliance in the exercise participation process. This study is proposed to investigate the effect of exercise related wellness activity choices on mood states and job satisfaction among employees in an urban academic workplace.

### Statement of the Problem

The main objective of this study is to measure what effects different wellness activity exercise participation levels within an urban wellness worksite exercise program might have upon participants' mood states and degrees of job satisfaction. Worksite wellness programs are gaining in importance all over North America with mixed results. Since many monetary and human resources are involved in such ongoing programs. A specific program assessment based on desirable attitudinal changes and behavioral outcomes appears to be beneficial for possible future program implementations.

### Conceptual Framework

Studies investigating preventive and protective health behaviors such as exercise participation have extensively used various research paradigms such as ones proposed by

Lazarus (1976), Morgan (1979b) and Fishbein and Ajzen (1981). Since there are numerous models from which to explain exercise participation behavior, the conceptual framework for this study involves the role of exercise upon psychological behaviors encountered in the workplace. Specifically this structure is an adaptation of Morgan's (1979b) Mental Health Model for exercisers and is concerned with levels of wellness activity participation and the psychological behaviors of self motivation, temporary mood states, and job stress or satisfaction.

Morgan's model represents the concept that high level performing athletes and exercisers are individuals who project the optimal mental health profile as determined by psychological states and traits assessments. Thus, high-level performing athletes and exercisers display a positive psychological mental health profile and have been found to score high in categories of evaluation, such as vigor and extroversion. Low-level performers display a negative mental health profile and have high scores in categories of anxiety, depression and confusion and low scores in vigor.

#### Significance of the Study

Reported total wellness benefits associated with regular physical exercise participation, combined with enormous costs related to health care and human disability,

have compelled policymakers to emphasize regular exercise participation as a strategy to enhance individual wellness. In 1979, public health officials specifically defined and outlined national physical wellness objectives that were to be accomplished by 1990 (DHEW, 1979). However, the goals as measured by the number of adults currently exercising on a regular basis have not been achieved. Mid-course data (Center for Disease Control, 1985) detailing slow progression toward attaining the 1990 federal "Objectives For The Nation" depict the following:

1. The proportion of adults 18 to 65 participating regularly in appropriate levels of physical exercise should be greater than 60 percent in 1990 as compared to an estimated 35 percent in 1978. The goal will not be met; between 1985 and 1988 only eight percent of adults exercise regularly at such a level.

2. Half of Americans 45 and older should walk, swim or engage in other appropriate aerobic exercise at least 20 minutes three times a week in 1990 as compared to an estimated 36 percent taking walks only in 1975. The goal will not be accomplished; in 1987 while 46 percent of adults 45 or older walked for exercise, only eight percent did so three times per week for twenty minutes.

The National Physical Wellness Objective deemed likely to be achieved by the end of 1990 was the provision for adults to participate in workplace sponsored exercise

programs. The detailed objective stated that "by 1990, the proportion of companies and institutions with more than five hundred employees offering employer-sponsored exercise-for-wellness programs should be greater than 25 percent as compared to approximately 2.5 percent in 1979." A 1985 survey reported 32 percent of workplaces with two hundred fifty or more employees offered workplace wellness programs. Approximately fifty thousand American companies (corporate, academic, or private) have operational health & wellness programs that include a physical exercise participation component (Center for Disease Control, 1985).

The result has been an estimated billion dollars spent annually on workplace wellness programs, and enormous capital outlay which have forced decision-makers to examine program cost effectiveness and outcomes (Hollander & Lengerman, 1988). However, research to evaluate and define outcomes have been inadequate. During the last seven years, the Aerobic Center Institute's staff, directed by Hollander and Feldman (1986), developed and evaluated employee fitness and wellness programs within the private, state, and federal sectors. These studies focused more on the effects of mental exercise activity (such as yoga and relaxation techniques) on employees' physical responses when compared to research on the effects of physical exercise activity on employees' psychological responses.

Moreover, the majority of these studies employed

descriptive or correlational designs which failed to ascertain statistical differences in effects of employees who initiated and maintained regular exercise participation and those who did not. Other studies have produced mixed results.

One possible explanation for inconsistent findings is the individual difference factor. What may be influential in one employee's choice to begin and continue a regular exercise participation regime may not have any influence on another. Likewise, the type and level of exercise physical activity that some employees chose to maintain wellness may not be the choice selected by others. Furthermore, the type and level of exercise physical activity choices required to yield positive job related psychological states may differ among employees on such factors as age, height, weight, and job position.

This study's research efforts are justifiable for several reasons. First, the study included variables of individual differences, specifically, self-motivation, the most consistent variable influencing transition from sedentary behavior to exercise participation behavior is examined. Workplace wellness promotion research that controls for individual differences and compares psychological changes among employee exercise participants and non-participants provides critical data for existing and future program development and implementation.

Secondly, the significance of the data analyzed in this study is cited in the U.S. Surgeon General's 1979 Healthy People Report which states that by 1990 research studies should have data documented for three major purposes:

1. to evaluate short and long term effects of physical exercise participation among adults in varied settings,
2. to evaluate the effects of employees' participation with regard to job related factors such as job performance, job satisfaction, absenteeism, employer health care expenditures, and employees physical and psychological responses, and
3. to monitor national trends and patterns of adult participation in exercise either as leisure activity or as a member of a wellness program through community and/or workplace facilities.

The overall significance of this study is that baseline data are obtained for assessing factors related to employee choices to participate or not to participate in a state sponsored academic workplace wellness program and that outcomes of participation and non-participation are identified.

The data analysis further serves the participating wellness promotion program by 1) making available useful data in policy decisions pertinent to academic institutions' roles, responsibility, and effectiveness in decreasing the



percent of employees who maintain sedentary life patterns; 2) reappraising the priority assigned to employee wellness promotion within the academic work environment, and 3) delineating specific recommendations based on findings of this investigative effort. The study's findings will be of crucial value in that this is the first study in which a sound research methodology has been employed to determine the effectiveness of three state sponsored and numerous corporate, military and private workplace wellness programs in the Southeastern Virginia urban communities.

### Methodology

The following outlines the details of experimental design, research procedures, statistical analysis procedures, as well as the hypotheses tested.

#### Design of Study

The study is an ex-post-facto design in that intact groups of subjects are studied. Self-motivation and demographic variables such as age, body mass index and job classification are used as statistical covariates or concomitant variables to equalize or control for such effects over the groups studied.

### Research Objective and Hypotheses

The purpose of this study is to determine the effects that varying levels of participation within a CommonHealth worksite wellness program has upon participants' mood states and job satisfaction. Independent variables are group membership, sex and repeated exercise sessions. Dependent variables are seven measures of mood states as measured by McNair's (et al., 1971) Profile of Mood states and three measures of job satisfaction reported by scores on the Minnesota Satisfaction Questionnaire (Bolton, 1980).

Central null hypotheses to test the overall significance of the major research objective are:

1. There will be no significant group differences identified for each of the ten dependent psychological variable analyses.
2. There will be no significant sex differences identified for each of ten dependent psychological variable analyses.
3. There will be no significant time differences identified for each of the ten psychological dependent variable analyses.
4. There will be no significant interactions among the group X sex X time possible combinations.

### Subjects and Setting

The pool of subjects consisted of over 1,000 employees at a Southeastern institution of higher education (College

of William and Mary) located within the urban "crescent" of Virginia (Cook, 1988). The "crescent" encompasses specific non-rural geographical regions in Virginia where eighty percent of the state's growth has been concentrated since 1950 and where ninety percent of the growth has occurred during the 1980s. The region extends from the tip of Loudon County in Northern Virginia to the North Carolina border in Hampton Roads (Cook, 1988).

Over 700 of the college's employees (pool of subjects) gave written consent to participate in some aspect of a screening and on-site Commonhealth wellness program. From this pool the study's sample of 108 subjects were drawn and they consisted of:

1. Seventy-two college employees enrolled in the state-funded worksite wellness program,
2. Thirty-six control subjects who were college employees not enrolled in the worksite wellness program.

### Instrumentation

A demographic survey form developed by the researcher, the Physical Activity Index (PAI) and three highly recognized psychological instruments were administered to the subjects of the study:

1. Self-Motivation Inventory (SMI),
2. Profile of Mood States (POMS),
3. Minnesota Satisfaction Questionnaire (MSQ).

The SMI (Dishman, et al, 1980) was used as the primary covariates of the study. The SMI has been found to be an effective psychological instrument in discriminating among those who would join or those who would or would not adhere to regular exercise participation in adult fitness programs. A major finding in the adult fitness setting has been that the desire to adhere to or to drop out of a prescribed exercise program appeared to be largely dependent upon the behavior disposition of self-motivation. Item analysis revealed an alpha reliability coefficient of .91 and the internal consistency stability reliability exceeded .86.

The POMS (McNair, Lorr and Droppleman, 1971) measures the psychological responses of mood states. The sixty-five item monopolar objective rating scale identified six mood states: Tension, Depression, Anger, Vigor, Fatigue, and Confusion. A global "Total Mood Disturbance Score" was also obtained by adding together negative states and subtracting the positive vigor score. Test-retest reliability has ranged from .65 to .74. Internal consistency has been shown to be .90 or above for all items within each factor.

The MSQ (Bolton, 1980) is a twenty item self-report measure on employee's assessment of work environments. Items represent intrinsic job satisfaction, extrinsic job satisfaction, and general job satisfaction, with normative data established for seven occupations to include college/university personnel. Internal consistency

reliabilities for the twenty items range from .81 to .94; retest reliability ranges from .61 to .90.

### Procedures

The research project was presented to designated administrative personnel for overall permission and related logistics details. During the screening period, the health promotion program members were invited to participate in the study, informed of the purpose of the study, and given instructions pertaining to their involvement. Participants were requested to complete consent forms, a demographic survey form and three psychological pencil and paper measures: 1) SMI, 2) POMS and 3) MSQ.

The instruments were administered by the investigator or a designated assistant who had received instruction prior to administering the measures to insure testing protocol consistency. Testing of the 108 study participants was conducted for eight weeks. CommonHealth group membership was comprised of subjects who are members of the university's Commonhealth promotion program in one of four groups:

1. nonexercise participation (NEP), no exercise participation (CHP-NOX),
2. outside worksite participation (OEP), exercise participation in self-directed physical exercise activities outside the worksite health program (CHP-SELEX),

3. inside worksite participation (IEP), exercise in self-selected physical exercise activities inside the worksite wellness program (CHP-CLASSX),

4. inside and outside worksite participation; exercise participation in self-selected physical exercise activities inside and outside the wellness program (CHP-EXCLASSX).

The fifth and sixth groups consisted of university employees who are not members of the CommonHealth program and they served as controls. Group five was considered self-directed active exercisers (CONT-SELFX) and group six was identified non-exercise participants (CONT-NOX).

#### Analysis and Interpretation of Data

The major research objective is a six (group) X two (sex) X three repeated (time) Analysis of Covariance (ANCOVA), for each of the ten dependent measures (7 POMS and 3 Job Satisfaction). This repeated measures design which controls for individual differences among subjects is used to assess group changes across the exercise participation time period. Specifically, mood state and job satisfaction measures are repeated at designated intervals for the same subjects. The F-ratio statistical technique is used for analysis of the data from these repeated measures (Ferguson, 1976).

The Self Motivation Inventory score, age, height,

weight and job classification are used as the covariates. The ANCOVA has been shown to be especially useful in factorial situations when intact groups are compared because the groups' performances can be adjusted for a distractor variables on which they differ such as the SMI and BMI.

Significant F-ratios for groups, sex or interaction effects are tested by post hoc procedures using multiple range tests ( $p < .05$ ).

### Delimitations

This study is delimited to 108 consenting subjects who are all employed by a higher education agency. The subjects represent an array of job positions as well as varying degrees of personal commitment to wellness activities. The study is further delimited by use of the Self-Motivation Inventory, the Profile of Mood States and the Minnesota Satisfaction Questionnaire.

### Limitations of the Study

This study's design is ex-post facto in which the experimental treatments and control involved intact rather than randomly formed groups. In research cases employing intact and non-matched groups, the existence of a multitude of unaccessed confounding variables impose limitations on inferences made from the results of the analyzed data. Thus, the analysis of covariance approach is used to

statistically control for concomitant variables upon which the groups are known to have initial differences. The covariant approach entails identifying variables most relevant to the research problem under study and providing equalization to the groups.

The use of volunteer sampling does add potential caution in the interpretation of this study's results and their generalizability to the target population. However, unless samples are extremely biased, the results most often have significant implications for the population from which the study's subjects were drawn.

A final potential limitation of this study could be the use of psychological inventories which Borg and Gall (1979) suggest are only accurate to the degree that the self-perceptions are accurate, and to the degree that the person evaluated is willing to express these perceptions honestly. This researcher had no identifiable or inherent reason to be concerned that the participating subjects would be motivated to fake or give inaccurate responses.

### Summary

Public health officials have made important policy decisions and recommendations with the intended purpose of promoting the adoption of more active lifestyle among American adults. Complex deterrents to the successful accomplishment of this objective exist even though benefits



that accrue with increased physical activity are becoming well established. First, physical activity and exercise participation behavior consist of various predictable and unpredictable human behaviors and subcomponents. Secondly, the goal to increase the numbers of American adults who exercise regularly is counteracted by self-motivation and adherence patterns.

The search for effective interventions to increase initiation and maintenance among sedentary segments of the adult population has extended into the workplace. This intervention strategy is appropriate in as much as job stress in the workplace has increased and the employee spends a high percentage of the time in the workplace.

The workplace health promotion and wellness programs have achieved widespread acceptance and are operational using private, federal, state and local funds. The effectiveness of the worksite programs has not clearly been defined either from an employee wellness benefit or an employer cost-effectiveness; however, employer cost-effectiveness studies far exceed those that pertain to employee health gains. This research explores the role of a workplace exercise program in the health wellness process. Therefore, this study provides a combination of theoretical and statistical data base relative to the workplace as a strategy to increase adult exercise participation and specifically to enhance psychological responses among

specifically to enhance psychological responses among employees.

## Chapter 2

### A Review of the Research Literature

Studies to investigate the psychological well-being and exercise participation relationship have focused on several variables. Griest et al., (1978, 1979) hypothesized that the beneficial psychological effects were due to multi-operational causes which result from: 1) a complex interplay of success achieved through exercises, 2) the distraction or conscious alteration possibilities inherent in vigorous physical activity participation, and 3) physiological/biochemical changes that occur as a result of acute and long term participation.

Morgan's Exercise Mental Health Model (1979b) infers that individual levels of exercise participation are useful in explaining the potential benefits of exercise in enhancing psychological categories of well-being. The review of the literature included previous research studies of the three psychological variables which are relevant to the Exercise Mental Health Model and applicable to the study of exercise participation in a workplace setting: 1) mood states, 2) job satisfaction and 3) self-motivation.

#### Mood States and Exercise

Generally, findings from personality research have suggested that physical activity may modify temporary state

variables such as anxiety and depression, but not permanent trait variables such as introversion or neuroticism (Morgan, 1973).

Nebeker's (1986) review of the literature reported numerous authors citing psychological benefits received either in conjunction with or derived solely from physical activities. Concluding evidence implied that exercise can improve such psychological parameters as self-confidence, feelings of control, self-esteem, imaginativeness, and self-sufficiency (Buffone, 1984; Diestbiter, 1984; Harris, 1981a, 1981b; Kostrubala, 1976; Morgan, 1981; Sachs and Buffone, 1984; Sacs and Sacs, 1981; Spino, 1976).

In a benchmark study, executives who were prescribed a jogging program to lose weight and maintain fitness levels reported greater significant psychological than physiological outcomes at the conclusion of the program. Positive changes in mental health responses were recorded. Self-image increased, whereas anxiety, tension, depression and anger decreased (Blumenthal, 1982).

Studies reviewed by Layman (1972) and Cureton (1960) during the 1960s and 1970s promulgated the positive relationship that physical experience activity has on improved psychological states. However, one criticism was that studies reviewed employed subjects who showed altered psychological states prior to the exercise intervention. Additionally, a majority of the studies that reported

positive outcomes failed to use control groups and none were methodologically designed to control for sampling bias.

There is further evidence to suggest that regular physical exercise has a psychological impact. For example, Weber and Lee (1968) randomly assigned 48 male albino rats to a sedentary condition which restricted them to a standard 10 X 8 X 7 inch cage. Moreover, they were in a voluntary exercise condition in which they were housed in a similar cage but were allowed access to a revolving exercise wheel. And finally, forced exercise consisting of daily swims with an overload of 2 percent attached to the animal's body weight. The experimental period commenced with the animal's thirty-first day of life and extended to the 65th day of life. At this point, animals were then evaluated on a standard test of "emotionality." The sedentary and voluntary exercise groups did not differ on any comparison, but the forced exercise group was observed to be less emotional than the sedentary and voluntary exercise groups on all comparisons.

The work of Weber and Lee (1968) is cited primarily to illustrate that research on animals suggests that vigorous exercise has a positive influence on psychological measures involving various animal models. The reasons for this reaction are not entirely clear, but theoretical and experiential evidence suggests that brain neurotransmitter levels are implicated (Olson and Morgan, 1982). Psychology

research involving humans has been consistent with the animal literature and supports the inverse relationship between lack of physical exercise and psychological wellness; that is, the lower the level of physical activity, the higher the degree of psychological imbalance (Folkins and Sime, 1981). The two most frequently examined mood states in the exercise literature were anxiety and depression.

#### Tension -- Anxiety and Exercise

The hypothesis that a positive relationship exists between physical exercise and anxiety "absorption" was tested by DeVries and Adams (1972) among a small group of men and women patients between 52 and 70 years of age. Subjects received tranquilizers the first day, but participated in a vigorous walking activity (raising of heart beats above 100 beats) per minute. The exercise produced a greater calming effect than the tranquilizer. However, the authors cautioned that the anxiety reduction could have been associated with the carry-over effect of the tranquilizer.

Orwin (1974) used running to overcome phobias and demonstrated that physical exhaustion interfered with anxiety. The study concluded that individuals could become conditioned to fears much more readily after vigorous exercise than without it. Thus, varied levels and types of

physical exercise should be used as a therapeutic adjunct to reduce negative wellness behavior such as anxiety (Morgan, 1981).

Research investigating the relationship of running and anxiety has not consistently reported reductions in trait anxiety; however, reported reductions in state anxiety following physical exercise have been consistent (Berger, 1987). Weltman and Stamford's (1983) study supported the consistent findings and cited a significant transitory, but not a sustained reduction in state anxiety among subjects during the immediate post-exercise period.

The State Trait Anxiety Inventory (STAI) has been used extensively in exercise and mood stated research. As an example, subjects who were assigned to an aerobic jogging program, a stress inoculation training group, and a waiting list (control groups) were administered the STAI prior to group assignment, post treatment, and a three months' post treatment. Both the jogging and stress training groups reported decreases in anxiety while the control group demonstrated no significant changes in anxiety level. The reduced anxiety changes were still in effect for both groups at the three month measure (Long, 1985). In another study, Berger (1983) found decreases in state but not trait anxiety in a study sample who maintained fitness through a swimming program.

Reasons to indicate why state anxiety decreases

following vigorous physical activity are not clear, but there is evidence that anxiety reduction may be the result of "distraction" or the "time out therapy." Bahrke and Morgan's (1978) study hypothesized that of 75 men randomly assigned subjects to an exercise meditation and/or a placebo group who exercised or meditated would have significant decreases in state anxiety. However, there was an unexpected decrease in the placebo group that did not significantly differ from that observed in the exercise or meditation groups. This serendipitous finding may mean that the "time out therapy" had the same anti-anxiety effect as does physical and mental exercise activity (Morgan, 1981).

Recently, Steptoe (1989) compared the psychological effects of a moderate aerobic training program and an attention-placebo strength and flexibility training program in previously inactive anxious adults from the general population of England. Effects as assessed with the Profile of Mood States, and State-Trait Anxiety Inventory revealed that the moderate exercise program was associated with significantly greater reductions in tension -- anxiety, depression, and other moods than the attention -- placebo condition.

Significant works cited in sports psychology research have underscored the value of psychological states and traits to discriminate between athletes of differing abilities. The most notable links in the relationship



between physical activity performance and mood states have been reported in elite athletic performance studies. Two salient features of these studies have been 1) the use of Profile of Mood States (POMS) as a measurement of temporary mood states; and 2) the consistent relationship between positive mood qualities and increased performance (Le Unes and Nation, 1989).

Silva and Hardy (1986) found a number of differences between eight qualifiers for the 1979 United States Junior World Team and seven non-qualifiers. Qualifiers differed psychologically most significantly from non-qualifiers on the POMS dimensions of anger (qualifiers were lower) and tension (qualifiers were higher).

More recently, Jackson et al., (1987b), used the Profile of Mood States to monitor the impact of mood states on the 1988 U.S. Olympic Women's Field Hockey team's performance and reported significant fluctuations in mood states associated with changing amounts of psychological stress. During five testing periods, optimal performance occurred when members displayed positive mood states.

#### Depression -- Dejection and Exercise

Studies investigating the effects of exercise on depression as a single variable or when combined with either self-enhancement variables are as numerous as those studies examining the anxiety-exercise-relationship.

Of the various self-enhancement variables, self-esteem emerged as the paramount variable in exercise psychology research. Collingwood and Willett (1981) reported significant improvements in male adolescents' body image, self-concept, and self-acceptance following a three month training period, and a six and twelve month follow-up. Steptoe's (1989) findings concurred with Morgan's (1981) conclusion that the effects of long-term exercise and improved mental states. He concluded that exercise six weeks or more has been associated with a decrease in depression and an elevation in self-esteem more commonly among individuals whose self-esteem scores were within low ranges during the pre-test phase.

Within the past year, the psychological benefits of aerobic exercise among juvenile delinquents were investigated. Changes in post-exercise included reductions in anxiety, tension, and depression, and increased self-esteem. Whereas less intensive recreational play or physically challenging "outward bound" programs can be effective in improving social attitudes and self-esteem, regular aerobic exercise may produce greater improvements in self-esteem and depression (MacMahon, 1990).

Brown et al., (1978) have lent support to the positive effects of exercise on depression reduction. Psychological outcomes of two sample groups who participated in either a three week or a five week running program showed increases

in mental well-being when compared with an inactive control group. The number of depressed subjects declined from thirty-seven to fourteen; the depressive mood of the non-runners were unchanged; and the amount of exercise was significantly related to the subjects' decreased depression changes. Brown, a psychiatrist at the University of Virginia, further described the anti-depressive effects of exercise, "Exercise works better than pills in controlling depression. Approximately 70 percent of the total depressed clients show rapid benefits after 10 weeks of running" (Brown, et al., 1978).

In a well-controlled group, Griest, et al., (1979), demonstrated that aerobic exercise performed for twelve weeks was not only essential with a reduction in depression, but also the improvement was superior to traditional forms of psychotherapy in eighty percent of outpatients with mild or moderate depression. All but one of the patients in the aerobic group were free of depressive symptoms at twelve months follow-up, where as half of the psychotherapy patients had returned for treatment.

Running as a therapeutic intervention for reducing depression has been propelled to the forefront of the exercise-psychological wellness research (Buffone, 1984; Buccola and Stone, 1975; Sachs and Sachs, 1981; Palmer-Hunter, 1982; Dyer, 1987; Gondola, 1982). But, Brown (1978) cautioned that such occurrence should in no way imply that

other exercises might not be useful in reducing depression. For an example, significant decreases in depression were reported by high school and college students who participated in wrestling, mixed exercises, and jogging. Tennis produced marginal but positive effects, while softball had no effect on depression scores.

King (1989) studied sedentary middle-aged males and females (n=120) randomly assigned to either a six month home-based aerobic exercise training program or a screened - only control conditions were assessed for psychological benefits. Results showed significant between-group differences on depression and anxiety scores. A notable value of this study was that in this experimentally-controlled study, subjects adherence rate exceeded seventy-five percent across the six months.

Increasingly, psychological human benefits, rather than cost benefits, of work-based exercise wellness programs have been assessed. Experienced changes from unhealthy mood states such as depression and anger to healthier mood states such as alertness and hopefulness were ranked by employees as the most valued benefit of worksite exercise programs. A majority reported that experiencing positive post-exercise moods was the factor that most influenced their decisions to remain in worksite exercise programs (Sheppard, 1989).

#### Anger --- Hostility and Exercise

Regular exercise participation regimens have been prescribed as a remedial intervention for juvenile delinquents. Changes following intensive exercise included significant reductions in anger, hostility and frustration. Such changes have been variously hypothesized as being related to an increased sense of control and mastery, a mediative effect, and an alteration in neurotransmitters (MacMahon, 1990). From this standpoint, MacMahon suggests further investigation to identify mechanisms by which exercise participation reduces anger, hostility and frustration and whether non-delinquent populations show similar desirable psychological responses.

Employees who reported working under pressure and staying angry for "long" periods of time scored low on hostility and anger levels following regular vigorous exercise participation both at the worksite and during non-working hours. Both administrative and staff exercise participants reported less frequent feelings of desire to abandon the job, getting angry over minor events, losing tempers, having feelings of an impending nervous breakdown, losing sleep and worrying about the job. More importantly, the quality and quantity of work performance improved more significantly post-exercise participation among employees who worked under pressure and remained angry for long periods of time than for groups who worked under pressure and experienced anger for less sustained periods of time

(Spielberger, 1984).

Cottingham (1987) proposed that the relationship of exercise participation and anger was dependent upon the type, the duration and intensity of anger being experienced. The modifying effects of exercise participation on occupational stress and suppressed anger were examined among employees in two urban plants. In a random sample of hourly workers who were hypertensive and aged 40-63, exercise participation showed the strongest association with men who were hypertensive and suppressed their anger than hypertensive male employees who reported no anger suppressive behavior.

#### Self-Related Mental Health States and Exercise

Positive psychological benefits beyond reductions in anxiety depression, anger, and increased self-esteem have been reported. A review of available literature (Folkins and Sime, 1981; Tomporski and Ellis, 1986) pertaining to the relationship between exercise and cognitive functioning concluded that while success has been achieved with geriatric mental patients, outcomes were much less clear with normal adults and children. Further studies involving aging subjects found that participants who engaged in which moderate levels of exercise (calisthenic, step-up tasks, bicycle pedaling, and running and walking tasks) tended to improve cognitive functioning.

The research of the literature review was not revealing regarding studies that report findings specifically related to the effects of exercise on single mood state variables regarding fatigue-inertia or vigor-activity. However, in subcomponents of the profile of mood states, fatigue and states of inertia reportedly decreased post-exercise participation while vigor and states of alertness increased.

### **Job Stress, Job Satisfaction, and Exercise**

There is an increasing awareness that the pressures of survival in the contemporary workplace have contributed to work related pressures that, in turn, may lead to severe personal consequences. For example, Derber, (1980) indicated that all levels of modern day careers involve varied degrees of job stress and dissatisfaction.

The interplay between job satisfaction/dissatisfaction and job stress has been useful to explain exercise participation behavior and psychological outcomes among employees in the workplace. The most stringent evidence for the dimension of job stress as a threat to wellness and general health comes from the Advance in Health Education Current Research Report (1984) in which eight of thirteen health workplace studies focused on job stressors, their consequences, and stress management. Findings from Pinee, Aronson and Kafay's (1981) study of occupational stress supported the thesis that stress on the job is an actual and

not a perceived threat. Moreover, a vast majority of work situations lack stress mediators in job stress situations although working under pressure and job stress has been strongly linked to level of satisfaction of the employee.

In most instances, the determination has not been made whether job dissatisfaction led to job stress or whether job stress led to job dissatisfaction. Conway (1989) claimed that one is the aftermath of the other and job stress is manifested as job dissatisfaction. Job stress is the seed that becomes job dissatisfaction. However, the conjecture that job stress is identical to job dissatisfaction is dismissed.

Gilbert (1986) concluded that job stress and job dissatisfaction, though distinct, occur simultaneously in response to individual perceptions. Therefore, a logical and empirical distinction between the two is comprehensible when:

1. Job satisfaction is conceptualized as an effective response of individuals which is reflected in the evaluations employees make of all salient aspects of the job and the organization in which they work.
2. Job stress is conceptualized as the psychological and/or physical responses to a set of stressors (either actual or perceived) that exist in the employees day to day work environment or the sum total of factors (stressors) experienced in relationship to work which influence the



psychological and/or physical homeostasis of the employee (Gilbert, 1986).

Studies examining the job stress/job satisfaction relationship consistently confirm the hypothesis that job stress alters job satisfaction levels. Employees exposed to work environments of infrequent and short levels of stress reported moderate to high levels of intrinsic, extrinsic and overall job satisfaction. Their job satisfaction profiles reflected self-worth, confidence, and feelings of job performance mastery (Murphy, 1986).

Workers exposed to frequent and long durations of pressure on the job had low scores on the same three measures. Twenty-five percent reported moderate to high job performance, feelings of inadequacy and withdrawal, and superficial relationships. Over 60 percent reported high feelings of job performance inadequacy and thus revealed they functioned on an "as-if-phenomenon": the employees represented themselves as overly friendly, self-confident, and happy as if being satisfied with the job but were actually dissatisfied, lacked self-confidence and inability to make decisions (Barnell, 1981, Avakion, 1984; Gaff, 1983; Rice, 1980; and Quinn and Thomas, 1980).

Similar responses were reported by women in semi-skilled occupations and those employed in predominantly male dominated occupations. Women employees indicated more job mobility, daily stress and job dissatisfaction than men;

similar factors were significantly related to a manifestation of Type A behavior for women. However, both male and female workers, managers and non-managers, reported beliefs that job pressure and dissatisfaction adversely affected their health. Significantly, each group reported increased rates of anger over minor incidences, loss of temper, disturbance in sleep patterns, incessant worry about the job, and thoughts of job abandonment (Patrick, 1984).

Studies examining the interrelatedness of job dissatisfaction, job stress, and burnout, have identified a number of specific contributive reoccurring intrinsic and extrinsic job stressors, such as role ambiguity, job conflict, and work overload. A strong relationship was found between such dissatisfying working conditions and other negative indicators, including tardiness, absenteeism, use of tranquilizing drugs and unhealthy mood states such as depression, anger and job burnout. Fewer negative work patterns and undesirable mental health behaviors were displayed among employees who participated in regular physical activity when compared with inactive employees (Margolis, Kroes and Quinn, 1984, Murphy, 1986).

Burnout has been associated with job dissatisfaction. The term burnout refers to a state of mental, emotional, and physical exhaustion brought on by persistent devotion to a goal, the achievement of which is dramatically opposed to reality. Burnout reportedly affects overly dedicated,

idealistic people who are motivated toward high achievement and who work in unrewarding, dissatisfying and pressure-laden situations (Maslach, 1982).

Burnout's devastating states of physical, mental and emotional exhaustion result in the development of negative self-concepts, negative attitudes toward work, life and other people, and a loss of idealism, energy and purpose. Staleness or apathy in the work performance, then, may be described as a severe symptom of ensuing burnout. This condition constitutes an early-warning sign of the extreme negative work patterns and mental states to come (Freudenburger and Ruhelson, 1981).

The Profile of Mood States has been effectively used to monitor and diagnose the onset of staleness and burnout in sports activity (Morgan, 1984; Morgan and Brown, 1983; Jackson, et al., 1987, 1988). Several recent investigations indicate that the psychological mood state profile of stale athletes is the opposite of successful athletes. For example, Morgan (1984) found that there was a stepwise increase in the varsity swimmer's mood disturbance that coincided directly with increases in swimming training, and decreases in the training regimen were associated with improvements in mood states. Feigley (1984) noted that the circumstance of job stress and athletic stress show remarkable parallels across all age levels.

Increasingly dysfunctional stress, a form of burnout,

has pervaded the academic work setting. In the university, economic, political, demographic and national and international forces, singularly or combined, have altered assumed employee advantages and stability. An Austin and Gamstrom (1983) literature review identified salient characteristics of faculty members. Prevailing factors include: 1) daily work experience, 2) perceived external pressures regulating the work experience, and 3) institutional responses to such pressures.

For example, Seldin (1987) concluded that the majority of faculty preferred teaching but often received mixed signals with regard to allocation of their energies among research, teaching, and service to achieve tenure. Such mandatory faculty tasks constituted a grave source of job stress. The strain is most evident when research-oriented faculty are pushed to teach and teaching-oriented faculty are pressured to do more research. A prime source of strain consists of incongruent demands and assigned increased teaching loads which have been spread unevenly. In Nussel's study, natural scientists had the lowest teaching loads and the least role conflict; humanities and social science faculty carried heavier teaching loads and experienced greater role strain.

Winkler (1982) observed that university and college employees ranked intrinsic factors above extrinsic ones to describe their overall job satisfaction levels. Extrinsic

factors, especially salary levels, retirement prospects, time constraints, and inadequate secretarial support were most frequently reported determinants of job dissatisfaction. In fact, Armour (1987) concluded that faculty morale had significantly declined over the last decade and non-involvement in planning and governance was a major contributing factor.

Similar to the work experience of faculty members, the work experience of college presidents has undergone dramatic change. The college presidency no longer affords a position of stability and exclusion from an increasingly complicated "international" society. The pressures that flow from this quandary are many and often disabling. Nason (1980) offers this description: "To please the governing board is to displease the faculty. To satisfy the faculty is to engender hostility in the governing board, local, state, and federal legislators, and on and on."

Nason (1980) further reported three intrinsic dimensions that create tension and stress among college presidents. First, the position of the presidency is intrinsically lonely, although it confers high status on individuals. Second, expectations are unclear although the president is under constant scrutiny. Third, the president's position confers a high degree of autonomy and power, although current pressures often threatened autonomy especially in centralized state systems.

When college president's satisfaction levels were examined, Hunter (1986) reported that college president's satisfaction resulted from the challenge of work, decision making, autonomy, relationships with students, faculty, and contribution to society. Dissatisfaction was associated with external pressures on college and universities, such as economic pressures, time limitations, and constraints on the invested authority especially in centralized state systems.

Studies of work stress exist among deans and department chair persons. These studies showed that as deans require more control over budgets, hiring, and policy making, conflict between faculty and deans increase. Perceptions of built in role conflict were reported by over 85 percent of deans who perceived their positions as "linking pins" between central administration and faculty (Kapel, 1979; Austin and Gamson, 1983).

Gmelch (1987) conducted a survey to ascertain what actions employers should use to address the problem of increasing tension, stress and dissatisfaction in the academic work setting. Responses included providing awards and recognition and worksite physical activity programs or mental relaxation sessions as an outlet for the wellness antagonistic conditions. Benefits of such wellness interventions, however, would only be accrued if employees were motivated to enter and maintain the exercise activities available.

### **Self-Motivation and Exercise Participation**

Exercise participation is a personal and behavioral-oriented task; and studies to determine whether individuals will continue exercising on a regular basis have used a number of different biological, psychological or a combination of the two factors. Focusing on biological factors, Gale, et al (1984), found that body weight and not percent fat was inversely related to exercise adherence among participants in a YMCA fitness program. Dishman (1983) reported results of a retrospective study of biological factors related to adherence in healthy men and a prospective study of adherence to a medically prescribed program. In both groups, dropouts who were heavier had a higher percentage of body fat.

Beyond the biological factors, Blumenthal (1982) found that persons who dropped out of a medically prescribed exercise program were distinguished from compilers by a certain set of physical and psychological characteristics observed at the time of entry into the program.

Oldridge (1979) and his co-workers conducted a prospective study of 678 patients in the Ontario cardiac rehabilitation program and found that both a health risk (smoking) behavior and blue collar occupation categories negatively affected adherence. Men who had professional jobs did not reflect better adherence patterns. However, professional women adhered at a much greater-than-expected

frequency. Female blue-collar workers also did not follow the pattern of men; 87 percent blue-collar female workers continued as compared to only 48 percent of blue-collar male workers.

Among a group of police officers, a lack of enthusiasm for an exercise program was found to be closely associated with lack of time for exercise. For an example, police officers who had dropped out of a three-day-per-week fitness program reported that they spent too much time traveling to and from the centrally located center (Gettman, Pollock, Ward, 1983).

Ward and Morgan (1984) found that factors related to exercise program adherence for 150 healthy adults included a variety of physiological, anthropometric, psychological, and demographic variables. Correlations co-efficients between all variables and attendance rates were low; however, certain patterns did emerge. Persons who continued the program for more than 10 percent of the sessions tended to be more physically fit women and less physically fit men. The early drop out men and women were more likely to 1) have less stability in the community, 2) less time at present address or occupation, 3) be single, and 4) not have children. Self-motivation scores for early drop outs were significantly lower, however, the correlation between self-motivation and attendance for all subjects was only  $R=0.052$ .

Within the psychological realm, Oldridge (1979)



observed that compliers received more social support both in and out of class than drop-outs and tend to come to exercise sessions with a friend or spouse. The concluding thesis was that group exercise provided a strong social support system and that exercise habit formation and maintenance were reinforced by the development of social support among exercise participants and a strong rapport between the exercise leader and participants.

Findings by Andrews and Parker (1981) showed significant differences in drop-outs and compliers in three areas: 1) perception of benefits of the program, 2) personal convenience, and 3) family attitudes. The drop-outs lacked enthusiasm for exercise, found less time for involvement, viewed exercise participation as an inconvenience and interference with jobs and family life and gained little or no support for participation from spouses. A high drop-out rate occurred despite individual attention and close contact between participants and exercise leaders.

Although the aforementioned biopsychosocial-based variables have been of value in predicting short-term exercise participation behavior, self-motivation, a single innate psychological variable, has consistently been found to be the best determinant for long-term participation. Dishman (1984) suggested that some people are better able to adopt and adhere to exercise regime because they are simply more motivated. Dishman (1984) further noted that, "Self-

motivation basically means that persons are reinforced more by their own goals than by those of others; hence they seem better able than others to stick to a behavioral decision or to finish what they start" (p.289).

Operationally defined self-motivation refers to the intensity and direction of individual behavior. The direction of behavior indicates whether a person approaches or avoids a particular situation; the intensity of behavior pertains to the degree of effort a person puts forth to accomplish that behavior (Dishman, 1984).

The role of self-motivation in programs of exercise adherence has been confirmed in programs designed for adult fitness, athletic conditioning, cardiac patients, commercial spas, preventive medicine, corporation fitness and community based programs. More than forty studies conducted in the past thirty years found motivation to be significantly related to compliance behavior (Stone, 1983).

In two validation studies, Dishman, et al. (1980, 1981) revealed that self-motivation scores accurately classified participants according to attendance status in approximately 80 percent of all cases and accounted for nearly 50 percent of the variance in exercise adherence behavior.

The results of Dishman and colleagues in obtaining salient self-motivation inventory predictions of exercise adherence have been replicated by several investigators. Sallis and Haskell (1986) found that self-motivation

significantly differentiated adult regular attenders and occasional attenders from dropouts. Thompson, et al. (1984) predicted numbers of weeks adherence to aerobic exercise in 45 college students by means of the self-motivation inventory for young adults.

Self-motivation significantly predicted the number of sessions, number of participants and patterns of attendance (Dishman, 1983; Martin, 1983; Snyder, et al., 1982; Stone, 1983). Stone (1983), using an adult self-motivation inventory, found that self-motivation inventory scores and smoking behavior significantly separated regular attending corporate aerobic and recreational participants from dropouts with an 80 percent accuracy.

Myers et al., (1983), found that participants in an exercise program who held negative convictions about the benefits of exercise tended also to have low attendance rates. In contrast, participants who were self-motivated and believed in the value of exercise, tended not only to display regular attendance behavior, but also maintained more positive physical and mental states.

Exercise participant's adherence patterns continue to be a major problem in determining the effects of regular exercise as a wellness choice; and a variety of variables have been associated with adherence and outcomes. Haynes's, et al., (1984), evaluation of 557 exercise adherence studies identified over 200 measured variables. Many of the results

were contradictory. Furthermore, measurements assessed in different studies were not used for comparison purposes.

### Summary

In summary, research studies related to Morgan's Mental Health Model and its role in exercise behavior were reviewed. These studies have shown that the adult public displays conflicting and indifferent attitudes, beliefs and behaviors regarding the need to initiate and to maintain physical exercise participation activity on a regular basis.

Private and public worksites have made exercise programs available to employees as a measure to buffer the increased intensity and duration of work related stress and thereby promote employee wellness. Though a logical place to promote wellness through exercise participation, workplace exercise programs continue to face the problems of employee attrition and compliance. The literature included numerous studies examining several factors that influence individuals to continue an exercise program; and self-motivation consistently emerged as the simple best predictor.

Although the evidence clearly suggests that aerobic exercise participation such as jogging, walking, swimming, bicycling, and calisthenics has a positive effect upon moods, findings remain unclear to show these benefits result from exercise per se. Are the benefits gained by the

effects of a distraction or time-out phenomenon as hypothesized by Morgan? An indication that the traction hypothesis have some merit can be extrapolated from Lichthman's and Posers' (1983) finding that no significant main effect or reliable interaction was found on any profile of a mood scale in their comparison of a physical group with a hobby group.

Questions with regard to the limited number of studies using quasi-experimental and experimental designs and employing voluntary or clinical subjects have surfaced in many of the limitations and generalizability of the research findings reported. Consequently, there appears to be conflicting evidence regarding the association of psychological well-being with appropriate levels of regular exercise.

### Chapter 3

#### Methodology

This chapter describes the research questions and hypotheses, research design, research procedures and data collection and statistical analysis procedures. Details of each are presented below.

The overall purposes of this study are 1) to ascertain current wellness activity choices of exercise participation among employees in a Commonhealth worksite health promotion program, and 2) to determine what effects varying levels of exercise participation would have upon participants' psychological responses. Group membership and sex served as independent variables. Dependent variables were seven measures of mood states as measured by McNair's Profile of Mood States and three measures of job satisfaction as reported by scores on (Bolton's, 1980) Minnesota Satisfaction Questionnaire. The seven measures of mood states were tension, depression, anger, vigor, fatigue, confusion and a total mood disturbance score. Internal, external and general job satisfaction comprised the Minnesota Satisfaction Questionnaire components. Self-motivation, as a covariate, was measured by Dishman's (1980) Self-Motivation Inventory.

### Research Questions and Hypotheses

A review of the literature reported numerous studies citing psychological benefits received either in conjunction with or solely derived from physical activity participation. To better understand, discover, or clarify the exercise psychological wellness relationship, the major research question for this study are: What effects do exercise participation levels have on employee's psychological mood states and job satisfaction?

Central null hypotheses to test the overall significance of the major research objective are:

1. There will be no significant group differences identified for each of the ten dependent psychological variable analyses.
2. There will be no significant sex differences identified for each of ten dependent psychological variable analyses.
3. There will be no significant time differences identified for each of the ten psychological dependent variable analysis.
4. There will be no significant interactions among the group X sex X time possible combinations.

### Design of the Study

This study represents an ex-post facto, nonrandomized,

block, repeated measures design. While not as robust a research design as an experimental approach, the quasi-experimental approach is one of the strongest methodologies likely to be possible to implement as part of an on-going health promotion, field based investigation. A six (group) x two (sex) x three (time) repeated measures design compared psychological mood states and job satisfaction of employees who participated in self-selected exercise for eight weeks and those of a control group of non-participating employees. Self-motivation and the demographic variables of age, height, weight and job classification were used as statistical covariates or concomitant variables to equalize such effects over the groups studied. The repeated measures design further controlled for individual differences among subjects as group changes were assessed across the study's participation time period.

#### Setting and Subjects

The pool of subjects consisted of over 1,300 employees at a Southeastern institution of higher education (College of William and Mary) located with the urban "crescent" of Virginia (Cook, 1988). The "crescent" encompasses specific non-rural geographical regions in Virginia where 80 percent of the state's growth has been concentrated since 1950 and where 90 percent of the growth has occurred during the



1980s. The region extends from the tip of Loudon County in Northern Virginia to the North Carolina line in Hampton Roads.

This study's subjects were selected using a two phase process. The first phase employed the nonrandomized intact group sampling process and pertained to sample selection for treatment groups. Borg and Gall (1975) describe the value of this method in research situations in which the investigator cannot study the effects of variables by experimentally manipulating human subjects. Four treatment groups were drawn from male and female university employees who voluntarily became members of the Commonhealth Inc. Wellness Program (CWP) and chose to participate in the program's exercise component. The program's purpose is to promote employees total wellness and is one of the three state-funded worksite health promotion programs currently operating in the Southeastern Virginia urban region. Subjects had completed several screening and survey activities (blood pressure monitoring, height and weight assessment, family history questionnaire, and wellness interests indications) that were sponsored by the program and supervised by the university's Physical Education Departmental staff.

Screening results indicated that employees' group statistics were above data base average incidences for health risks such as hypertension, high stress levels, and

lack of regular exercise (Commonhealth Group Health Profile, 1987). However, the overall group did demonstrate better than average health and wellness practices in the area of blood pressure monitoring, physical examination frequency, seat belt use and other safety habits (Commonhealth Group Health Profile, 1987).

Interpretation of individual health profiles showed that screened employees, as a group, had at least six significant indices of modifiable health and wellness risk factors when compared to data base incidences. More importantly, over 80 percent of all screened employees demonstrated an interest in exercise programs as part of wellness promotion interventions (Commonhealth, 1988).

The second phase of sample selection focused on subjects for the controlled group. This group consisted of employees who neither became members of Commonhealth Program nor participated in the worksite health screening activities. The college directory was used to randomly select employees from varied disciplines and job positions. Fifty-seven such employees initially consented to participate. When control subjects were assigned, 23 non-Commonhealth member employees who participated in varied levels of exercise, comprised a control self exercise group and 34 non-Commonhealth member employees who participated in no regular exercise program comprised the final group of the study.

The final study sample included 108 men and women administrators, faculty, spouse and support staff who were assigned group membership as follows:

1. Commonhealth membership and non-exercise participation (CHP-NOX),
2. Commonhealth membership and participation in self-directed exercise outside worksite wellness program (CHP-SEAFX),
3. Commonhealth membership and exercise participation within worksite wellness program (CHP-CLASSX),
4. Commonhealth membership and exercise participation within an outside worksite wellness program (CHP-EXCLASSX)
5. Non-Commonhealth membership and self-directed exercise program (CONF-SEAFX),
6. Non-Commonhealth membership and non-exercise participation (CONT-NOX).

### Instrumentation

The Physical Activity Index and Demographic Survey PAI/DS and the three highly recognized psychological instruments administered to the subjects of this study included:

1. Self-Motivation Inventory (SMI),
2. Profile of Mood States (POMS),
3. Minnesota Satisfaction Questionnaire (MSQ).

The PAI/DS (Appendix ) was used to ascertain gender, physical exercise levels, age, height, weight and job classification. Gender and categories of activity levels were used as independent variables; age, height, and weight and job classification were used as covariates.

The SMI was used as another covariate. The SMI has been found to be an effective psychological instrument in discriminating among those who would join or those who would or would not adhere to regular exercise participation in adult fitness programs. A major finding in the adult fitness setting has been that the desire to adhere to or to drop out of a prescribed exercise program appeared to be largely dependent upon the behavior disposition of self-motivation. Item analysis of the SMI revealed an alpha reliability coefficient of .91 and the internal consistency stability reliability exceeded .86.

The POMS measured the psychological responses of mood states. The sixty-five item monopolar objective rating scale measured six identifiable mood states: tension, depression, anger, vigor, fatigue, and confusion. A global "Total Mood Disturbance Score" was obtained by adding together negative states and subtracting the positive vigor score. Test-retest reliability ranged from .65 to .74. Internal consistency is .90 or above for all items within each factor.

The MSQ is a twenty item self-report measure on

employee's assessment of work environments. Items representing intrinsic, extrinsic, and general satisfaction, and normative data have been established for seven occupations to include college/university personnel. Internal consistency reliabilities for the twenty items range from .81 to .94; retest reliability ranges from .61 to .90.

Following the health screening, employees were introduced to the health intervention components and activities that were available at the worksite to support healthier lifestyles. The screened employees then had the opportunity to participate on their own time in regularly scheduled exercise sessions offered by the CHWP.

#### Data Collection

The research project and related logistic details were presented to designated administrative personnel after which permission was granted to conduct the on site research project. Permission was likewise requested and granted through the Human Subjects' Committee of the Darden College of Education. During a series of screening activities, health program members were invited to participate in the study, informed of the purpose of the study, and given instructions pertaining to their involvement.

Participants were requested to complete consent forms,

a physical activity index demographic form and three pencil and paper measures: 1) SMI, 2) POMS, 3) MSQ. The instruments were administered by the investigator or the site coordinator who had received instruction prior to administering the measures to insure testing protocol consistency. Testing of group participants (each group comprised of 18) was conducted for eight weeks.

Throughout the eight week study period, Commonwealth Wellness Program members participated in exercise that varied according to the amount and type of activity and the setting in which the exercise occurred. Group one participated in no regular exercise, while group two participated in self-directed exercise outside of the Commonwealth work wellness program. Members in group 3 participated in exercises provided by Commonwealth wellness program that were held in the college's physical education building. Group 4 participated in regular exercise held at the university location and outside the worksite wellness program.

The fifth and sixth control groups consisted of university employees who were not members of the Commonwealth program and served as controls; group five participated in regular exercise on their own at various levels and group six remained physically inactive.

Two considerations guided the data collection. First was the desire to have measurable periods of exposure to

varied levels of exercise participation. Therefore, the six groups of subjects completed the psychological instruments at the beginning, midpoint, and end of an eight week session. Second was the desire to monitor exercise participation behaviors over a period of time, thus, a check-in sheet was used by the coordinator of the on-site exercise program.

During the fall academic semester, subjects were requested to attend one screening and 3 data collection sessions. The screening sessions consisted of 1) an interview assessing demographic information, personal and family history, nutritional practices, and health-related behaviors, and 2) actual measurements of height, weight and blood pressure.

At the first data collection session, subjects were instructed to complete the POMS questionnaire which measured the seven mood states. The MSQ which measured job satisfaction and the SMI which measured self-motivation were also administered at this time. Self-motivation scores were obtained for use as a covariate and was measured only during the first session.

The second and third sessions served as repeated testing and employees were instructed to complete only the POMS and MSQ psychological instruments. Administration of tests to all groups except the two control groups took place in the college's physical education building. Test

administration method for the control groups was a three time mail distribution of packets through the university's post office. Packet contents in the first mailing included a consent form (Appendix A), and the SMI, MSQ, and POMS instruments, and the PAI/DS (Appendix B). The second and third packets only included instruments to measure the dependent variables, MSQ and POMS. Follow up correspondences (Appendix C) were mailed to maintain interest over the eight week trial period as well as to encourage responses of control groups who participated through mail distribution. Of the original 113 employees who participated, two failed to test during the second session, three in the third. Responses from the SMI, MSQ and POMS were scored by use of computerized test scanning sheets. Information obtained from the PAI/DS was analyzed by the pencil and paper method.

### Data Analysis

The major research objective was a six (group) X two (sex) X three repeated (time) analysis of covariance (ANCOVA) (Ferguson, 1976), for each of the ten dependent measures (7 POMS and 3 Job Satisfaction). This repeated measure design which controls for individual differences among subjects was used to evaluate groups's changes across the exercise participation time period. Specifically, mood



state and job satisfaction measures were repeated at designated intervals for all of the subjects. The multivariate F-ratio statistical technique was used for analysis of the data from the repeated measures.

The Self Motivation Inventory Score, age, height, weight and job positions were used as the covariates. Kashigan (1986) describes the ANCOVA as especially useful in factorial situations when intact groups are compared because groups' performances can be adjusted for distractor variables on which they differ. Significant group, sex or time interactions effects were tested by post hoc procedures using multiple range tests ( $p < .05$ ). Generalizations to other adult exercise and wellness programs were viewed in light of significant results, the power of the results, and the nature of the total sampling process. Complete data analyses are presented in Chapter 4.

## Chapter 4

### Analysis and Interpretation of Results

Several preliminary analyses were necessary prior to evaluating the main effects of exercise participation levels over three time periods on employees' mood states and job satisfaction could be attempted. These data analyses were organized in a sequential manner. First, steps taken to identify relevant baseline demographic variables associated with exercise participation as reported from the Physical Activity Index and Survey Form are discussed and presented as descriptive analyses of the data. Second, the rationale and the statistical technique to reduce error variance and to statistically equate groups on initial individual differences are described. Finally, the results of analyses testing the main effects of group, sex, and time on three employees' job satisfaction variables and seven mood state variables (Hypotheses 1, 2 and 3) and the interactive effect of group X sex X time, (6 X 2 X 3) on the ten measured psychological variables (Hypothesis 4) are presented. These analyses are the major thrusts for the study and provide the evidence for testing the hypothesis.

### Descriptive Analysis of Data

Indigenous to the design used in this study is the

initial question regarding comparability of employee demographic characteristics. Demographic characteristics pertinent to this study were levels of exercise, age, sex, height, weight, job position and self-motivation. Degrees of self-motivation were analyzed using responses on the SMI. The PAI/DS responses were analyzed to identify six categories of exercise participation and the five demographic variables of age, sex, height, weight and job position. The height and weight variables were computed to formulate the body mass index (BMI) variable.

#### Analysis of the Covariants

The data analyzed in this investigation were obtained from intact groups. Hence it was conceivable that group participants' responses could have been influenced by demographic variables on which group members differed. A particular concern was in reference to the age, height, weight, job position, and self-motivation among employees in an academic workplace setting. Therefore, the predictive value of self-motivation, age, job status and body mass index (height and weight) were determined to ascertain the extent to which employees' mood state and job satisfaction measures could be contaminated by concomitant extraneous or covariates. Self-motivation had the highest predictive value throughout the investigation. For example, Table 1

indicates self-motivation to have the strongest correlation with the positive mood state vigor ( $R = .974$ ) and internal ( $R = .978$ ) and general job satisfaction ( $R = .945$ ). Table 1 also shows that job classification correlated highly with the mood state Fatigue ( $R = .725$ ) and moderately to low on all other variables age, BMI, and job classification revealed lesser association than the SMI, with little predictive or controlling value. Age and body mass index correlated moderately to low with most dependent measures.

Table 1

Correlations Indicating Impact\* of Covariates Upon Predicted  
Dependent Variables

Dependent Variables	COVARIATES			
	Self Motivation Inventory	Age	Job Classi- fication	Body Mass Index
Tension	.836	.403	.292	.404
Depression	.701	.452	.469	.423
Anger	.724	.471	.408	.463
Vigor	.974	.086	.065	.246
Fatigue	.325	.580	.725	.037
Confusion	.829	.551	.053	.448
Total Mood Disturbance	.807	.408	.356	.354
External Job Satisfaction	.816	.489	.406	.376
Internal Job Satisfaction	.978	.003	.332	.318
General Job Satisfaction	.945	.183	.394	.348

\* df = 106; P.05 =  $r \geq .194$ ; P.01 =  $r \geq .254$ .

### Inferential Analysis of Data

Repeated measures Analysis of Covariance (ANCOVA) were conducted to statistically analyze the main effects of group, sex, and group X sex interaction for each of the ten employee psychological measures. The ANCOVA results recorded in Table 2 represent data for testing hypotheses one and two formulated for this study. Hypothesis one was that there would be no significant group differences identified for each of the ten psychological variable analyses. Table 2 indicates group differences were found to be significant for eight of the ten employee psychological variables at the .01 level of significance: tension, depression, anger, vigor, fatigue, total mood disturbance score, internal job satisfaction, and general job satisfaction. No significant group differences existed for the mood state variable "confusion," or external job satisfaction.

Follow-up statistical analyses (see Table 3) using the Newman-Keul's Multiple Range Test were performed to determine which of the four treatment and two control groups contributed most to adjusted between group variance for each of the significant psychological variables studied.

Table 2

Psychological Group Means (N=18 for Each Group) Mean Square Error (df error = 92) Adjusted by Covariates (Self Motivation, Age, Job Classification and Body Mass Index) and Significance of F - Tests<sup>a</sup>

Dependent Variable	Group						MSE
	CHP- NOX	CHP- SEAFX	CHP- CLASSX	CHP- EXLASSX	CONT- SEAFX	CONT- NOX	
Tension**	18.1	22.1	12.5	12.0	16.3	24.5	90.3
Depression**	20.3	16.5	10.2	7.0	14.2	27.2	152.8
Anger**	17.6	18.	8.7	6.5	10.2	17.7	113.6
Vigor**	29.9	31.6	32.5	37.5	34.4	25.7	43.1
Fatigue**	17.1	18.2	11.6	8.9	14.3	18.9	60.3
Confusion	11.0	13.3	9.7	7.8	9.9	12.8	43.9
TMDS**	54.3	56.7	20.3	4.8	30.6	75.6	2056.6
EXT**	37.2	39.3	42.6	41.7	41.6	21.6	66.4
INT	98.4	98.2	100.8	104.7	100.7	106.7	121.8
GEN*	135.3	137.4	143.7	146.0	141.8	128.0	232.4

<sup>a</sup>All interactions were nonsignificant and omitted.

\*p<.05

\*\*p<.01

As shown in Table 3, Group 2: CHP-SELFX (M= 22.1) and Group 6: CONT-NOX (M= 24.59) differed significantly from the other four groups for the variable Tension. Employees in these two groups had higher Tension levels when compared with employees in the other four groups.

For the Depression psychological variable, employees in Group 1: CHP-NOX (M= 20.34) and Group 6: CONT-NOX (M= 27.28) reported the highest depression mean scores when compared with the other four groups. Thus, highest Depression mean scores were recorded for the lowest level exercise participating groups.

In the analysis of Anger scores, Group 1: CHP-NOX (M= 17.6), Group 6: CONT-NOX (M= 17.78) and Group 2: CHP-SELFX (M= 18.0), exhibited the highest values that were significantly different from the other three groups. The most active employees in both the treatment and/or control groups reported the lowest and positive anger scores.

Positive but inverse differences were reported for the psychological variable Vigor. Group 4: CHP-EXCLASSX (M= 37.56), Group 5: CONT-SELFX (M= 34.48), Group 3: CHP-CLASSX (M= 32.54) and Group 2: CHP-SELFX (M= 31.61) had the highest vigor scores and were significantly different from Group 6: CONT-NOX. Group 4 was also significantly different from Groups 1 and 2. Employees who participated in the highest levels of exercise scored highest on the Vigor mood state variable. Those groups engaged in low exercise levels possessed less psychological vigor.

For Fatigue, groups who had decreased levels of



physical exercises and activities, Group 1: CHP-NOX (M= 17.14), Group 2: CHP-SELFX (M= 18.27), and Group 6: CONT-NOX (M= 18.91) reported higher psychological fatigue and differed significantly from Group 4. In addition, Group 6, non-CommonHealth members who engaged in no regular physical exercise activity was significantly higher on Fatigue than Group 3.

On the Total Mood Disturbance Score, post hoc analysis of the group main effect revealed that Group 4: CHP-EXCLASSX (M= 4.84), had the lowest (best adjustment) Total Mood Disturbance Scores. Thus they differed significantly from Groups 1: CHP-NOX (M= 54.31), Group 2: CHP-SELFX (M= 56.72), and Group 6: CONT-NOX (M= 75.66); almost exclusively sedentary groups of employees. Groups 3 and 5 were also significantly better than Group 6.

Table 3 also depicts post hoc analysis of significant F values observed for the Job satisfaction psychological variables. The external satisfaction component was highest for Group 3 (M= 42.68), the least sedentary group and lowest for Group 6 (M= 21.66), the most sedentary group of employees. Group 6 demonstrated lower general job satisfaction than any of the groups who participated.

The Newman-Keuls procedure revealed that Group 4 (M=146.05), Group 5 (M= 141.82), and Group 3 (M= 143.74) experienced high levels of general job satisfaction and were significantly different from Group 6 (M= 128.06) which experienced the least amount of external job satisfaction. Hypothesis one as formulated for the study was rejected. Significant differences were found for 8 of the 10

psychological measures analyzed by repeated one-way analysis of variance and the post hoc analysis the Newman-Keul's multiple range test with the confidence level of  $p < .05$ .

Hypothesis two was that no sex difference would be identified for each of the ten psychological variables. These analyses in Table 2 revealed that although group main effects existed for six mood state variables and two job satisfaction variables, no sex main effects for any of the ten psychological variable analyses were indicated. The second hypothesis (null) was accepted at the  $p < .05$  level.

It was hypothesized (Hypothesis 3) that no significant time difference would be identified for each of the ten psychological dependent variables. As presented in Table 4, the time variable had significant main effects on employees' mood states of Tension, Depression and Total Mood Disturbance Score. No significant time main effects were observed for any of the three job satisfaction variables.

Post hoc Newman-Keuls multiple range test was used to determine which assessment times were significantly different from other times observed in Tension ( $P = .000$ ), Depression ( $P = .007$ ), and Total Mood Disturbance Score ( $P = .002$ ). Table 4 indicates that employees' tension scores were highest for Time 1 ( $M = 10.65$ ) and Time 2 ( $M = 10.76$ ); but were lowest by Time 3 ( $M = 9.11$ ). The longer employees participated in the study, the lower the Tension scores became. The same time effects were observed for Depression and the Total Mood Disturbance Score dependent variables. Employees' mood states of tension, depression, and total disturbance scores decreased as the time involved in the

study and exercise participation increased as also demonstrated with the tension mood.

The fourth and final hypothesis formulated for the study was there would be not significant interactions among the group X sex X time combination effects on employees' mood states and job satisfaction. Analyses to determine combined group by sex by trial interaction effects for each of the seven mood state variables and each of the three job satisfaction variables failed to yield significant F ratios. P-values ranged from ( $P = .136$ ) for Confusion to ( $P = .928$ ) for Internal Job Satisfaction. The fourth hypothesis (null) was statistically accepted.

Several significant findings were obtained from the data analysis. In Chapter 5 these findings are summarized and discussed. Interpretations are also presented in light of previous research. Implications for the use of the findings as well as recommendations for future research are enumerated.

Table 3

Student Newman-Keuls Procedure Multiple Range Test for  
Adjusted Group Differences

Tension						
<u>Mean</u>	<u>Group</u>	<u>4</u>	<u>3</u>	<u>5</u>	<u>1</u>	<u>2</u> <u>6</u>
12.00	CHP-EXCLASSX (4)					
12.55	CHP-CLASSX (3)					
16.39	CONT-SELFX (5)					
18.09	CHP-NOX (1)					
22.14	CHP-SELFX (2)	*	*			
24.59	CONT-NOX (6)	*	*			
Depression						
<u>Mean</u>	<u>Group</u>	<u>4</u>	<u>3</u>	<u>5</u>	<u>2</u>	<u>1</u> <u>6</u>
7.02	CHP-EXCLASSX (4)					
10.28	CHP-CLASSX (3)					
14.28	CONT-SELFX (5)					
16.52	CHP-SELFX (2)					
20.34	CHP-NOX (1)	*				
27.22	CONT-NOX (6)	*	*	*	*	
Anger						
<u>Mean</u>	<u>Group</u>	<u>4</u>	<u>3</u>	<u>5</u>	<u>1</u>	<u>6</u> <u>2</u>
6.55	CHP-EXCLASSX (4)					
8.70	CHP-CLASSX (3)					
10.24	CONT-SELFX (5)					
17.63	CHP-NOX (1)	*	*	*		
17.78	CONT-NOX (6)	*				
18.00	CHP-SELFX (2)	*				

Table 3 (continued)

Vigor		
<u>Mean</u>	<u>Group</u>	<u>6 1 2 3 5 4</u>
25.69	CONT-NOX (6)	
29.96	CHP-NOX (1)	
31.61	CHP-SELFX (2)	*
32.54	CHP-CLASSX (3)	*
34.48	CONT-SELFX (5)	*
37.56	CHP-EXCLASSX (4)	* * *
Fatigue		
<u>Mean</u>	<u>Group</u>	<u>4 3 5 1 2 6</u>
8.96	CHP-EXCLASSX (4)	
11.66	CHP-CLASSX (3)	
14.29	CONT-SELFX (5)	
17.14	CHP-NOX (1)	*
18.27	CHP-SELFX (2)	*
18.91	CONT-NOX (6)	* *
Total Mood Disturbance Score		
<u>Mean</u>	<u>Group</u>	<u>4 3 5 1 2 6</u>
4.84	CHP-EXCLASSX (4)	
20.37	CHP-CLASSX (3)	
30.63	CONT-SELFX (5)	
54.31	CHP-NOX (1)	*
56.72	CHP-SELFX (2)	*
75.66	CONT-NOX (6)	* * *

Table 3 (continued)

External Job Satisfaction		
<u>Mean</u>	<u>Group</u>	<u>6 1 2 5 4 3</u>
21.66	CONT-NOX (6)	
37.26	CHP-NOX (1)	*
39.34	CHP-SEAFX (2)	*
41.67	CONT-SEAFX (5)	*
41.71	CHP-EXCLASSX (4)	*
21.67	CHP-CLASSX (3)	*
General Job Satisfaction		
<u>Mean</u>	<u>Group</u>	<u>6 1 2 5 3 4</u>
128.06	CONT-NOX (6)	
135.32	CHP-NOX (1)	
137.39	CHP-SEAFX (2)	
141.82	CONT-SEAFX (5)	*
143.74	CHP-CLASSX (3)	*
146.05	CHP-EXCLASSX (4)	*

\*Denotes pairs comparisons significantly different at the .05 level.

Table 4

Psychological Time Means (N=108 for each time) and Mean Square Errors (df error = 192) Adjusted by Covariates (Self Motivation, Age, Job Classification and Body Mass Index) and Significance of F-tests<sup>a</sup>

Dependent Variables	Time			MSE
	Pre Time 1	Mid Time 2	Post Time 3	
Tension*	10.7	10.8	9.1	10.88
Depression*	9.72	9.6	8.3	12.11
Anger	7.9	7.8	7.1	11.82
Vigor	18.0	18.4	19.0	12.41
Fatigue	8.6	8.6	8.6	10.39
Confusion	6.6	6.2	5.9	10.20
TMDS*	25.5	24.5	20.1	138.25
EXT	21.7	21.1	21.9	27.20
INT	58.5	58.6	59.0	17.52
GEN	80.0	79.7	80.8	46.91

<sup>a</sup>all interactions were nonsignificant and omitted.

\*p<.01

Table 5

Student Newman-Keuls Multiple Range Test for Adjusted Time Differences

Dependent Variables

Tension

<u>Means</u>	<u>Time</u>	<u>3 1 2</u>
9.1111	Post-3	
10.6574	Pre-1	*
10.7685	Mid-2	*

Depression

<u>Means</u>	<u>Time</u>	<u>3 2 1</u>
8.3333	Post-3	
9.5648	Mid-2	*
9.7222	Pre-1	*

Total Mood Disturbance Score

<u>Means</u>	<u>Time</u>	<u>3 2 1</u>
20.0556	Post-3	
24.4907	Mid-2	*
25.4722	Pre-1	*

\*Denotes pair comparisons significantly different at the .05 level.



## Chapter 5

### Summary, Discussion, Conclusions and Recommendations

#### Summary and Discussions

The main objective of this study was to measure the effects an urban wellness worksite exercise program might have upon participants' mood states and degrees of job satisfaction. Interaction of psychological changes and physical exercise participation choices among groups of college employees were compared. The conceptual framework for this work involved the role of exercise upon psychological behaviors encountered in the workplace, which was an adaptation of Morgan's (1979b) Mental Health Model for exercisers.

Morgan's model contends that high-level performing athletes and exercisers are individuals who project the optimal mental health profile as determined by psychological states and traits assessments. Thus, high level performing athletes and exercisers display a positive psychological mental health profile, and they have been found to score high in categories of evaluation, such as vigor and extroversion.

### Summary of Findings

A summary of major findings revealed one's choice of physical exercise participation was significantly related to one's degree of psychological mood state as well as to one level of job satisfaction. Specifically, the results are summarized as follows:

1. Significant groups differences were found for six out of seven of the mood states as measured by the POMS. The most positive mood state profiles were exhibited by individuals who were the most physically active. No significant group differences existed for Confusion.
2. Group differences were also significant for two out of three of the job satisfaction measures (MSQ) observed. Similar to the POMS results, the MSQ data revealed that physically active subjects had the highest degree of external and general job satisfaction. No significant group difference was noted for internal job satisfaction.
3. There were no significant sex differences noted for any of the ten psychological dependent variable analyses..
4. There were no significant group by sex interactions observed between any of the ten psychological dependent variables.
5. Of the ten time analyses conducted, significant results were obtained for three mood conditions (Tension, Depression and Total Mood Disturbance Score). Each of these conditions

became more favorable as the study progressed.

6. There were no significant interactions among the group X sex X time combination effects on employees' mood states job satisfaction measures.

7. Of the four covariate employed in the study, the Self Motivation Index proved to be the most significant in all cases. Job status as a covariate had a significant impact on the analysis of psychological Fatigue (POMS).

### Discussion

This present study examined the outcomes of varied choices of physical exercise participation on three components of employees' job satisfaction and profile of mood states. The theoretical bases of Morgan's Mental Health Model were supported. Employees participating in higher levels of exercises showed the most positive psychological well-being profile; all exercise participating groups showed significantly better mood states as compared to non-participating groups.

Participating employees reported desirable low scores in negative mood states of depression, tension, anger, fatigue and total mood disturbances, as well as high vigor and external and general job satisfaction scores. In addition, negative mood states of depression, tension and global total mood disturbance improved as scores decreased

significantly as the time involved in the study increased. Participants did not demonstrate significant differences in confusion and internal job satisfaction scores.

Of particular interest was the finding that membership within the state supported CommonHealth Wellness Program was not the sole reason for the significant and supportive results to the model. From the various analyses the rankings for the mental health profiles of the six groups studied were ordered most favorable to least favorable as listed:

Most Favorable				Least Favorable	
CHP EXCLASSX	CHP CLASSX	CHP SELFX	CONT SELFX	CHP NOX	CONT NOX
Group 4 CHP-EXCLASSX	CommonHealth Employee members who participated in physical exercise activity inside and outside the worksite program,				
Group 3 CHP-CLASSX	CommonHealth Employee members who participated in physical exercise activity inside the worksite program,				
Group 2 CHP-SELFX	CommonHealth Employee members who participated in self-directed physical exercise activity outside the worksite program,				
Group 5 CONT-SELFX	Non-CommonHealth Employee members who participated in self-directed physical exercise activities,				
Group 1 CHP-NOX	CommonHealth Employee members who participated in no regular physical exercise activity,				
Group 6 CONT-NOX	Non-CommonHealth Employee members who participated in no regular physical exercise activity.				

In defense of the Commonhealth Wellness Program there are opportunities for wellness screening activities and wellness and safety instruction, in addition to fitness instructional activities. Reactions of Commonhealth participants indicated an awareness that the employer was providing useful and healthful opportunities for them and their spouses. This awareness was not measured within the study although it might have had an impact of the psychological results obtained.

The data revealing positive mental health profiles corroborate previous research with tension/anxiety (Orwin, 1974; Morgan, 1979a; Barkhe and Morgan, 1978; Berger, 1983; Stepetoe, 1989; Silva, 1986; and Jackson, 1987a), with depression/rejection (Morgan, 1982; MacMahan, 1990; Brown et al, 1978; Griest, 1979; and King, 1989), and with job satisfaction and mood states (Morgan, 1984; Margolis, et al., 1984; Morgan and Brown, 1983; Murphy, 1986 and Jackson, 1987b). Taken together the findings presented suggest that the effects of employees' choices to participate in exercise had an associative effect on six of seven mood state variables and two of three job satisfaction/ dissatisfaction variables (eight out of ten dependent variables studied).

Findings and conclusions are based on a non-randomized, intact groups that used statistical techniques to control for initial individual differences. Varied categories of physical exercise participation to assess effects on ten

measures of university employees psychological well-being was not merely valuable in determining the effects of exercise on mood states and job satisfaction, but, also added supportive evidence to the literature on the beneficial psychological states gained from physical exercise participation.

### Conclusions

This study investigated the effects of physical exercise from a psychological focus. In conclusion, findings of this investigation demonstrate that both positive psychological well-being, as measured by seven mood states, and high scores on three job satisfaction components were significantly related to varied levels of employees' physical exercise participation choices. Although cause was not investigated, the study found supportive evidence to suggest that employees who make choices to participate in varied levels of exercise on a regular basis will display more positive mood states and experience higher degrees of job satisfaction than employees who chose sedentary lifestyles.

Employers with a fundamental commitment to promoting employees psychological wellness at the highest level should continue to implement existing work place exercise programs and develop additional programs. However, the need for

additional research from both program development and evaluation aspects is rather expansive. Researchers must recognize and accept this challenge while policy makers should support research efforts as yet another alternate approach to contribute to high wellness profiles among the American adult population.

This study provided evidence for the role of work-based health wellness programs as a strategy to promote psychological wellness and to deter the onset of acute and chronic mental health problems. Therefore, the direction of future employer/institutional actions and decisions must be directed by two purposes: first to support continued program development and implementation and second, to bolster methodologically sound research endeavors to determine whether work-based programs contribute to the number of adults who make choices to become and remain physically active and the effect of such choices health promotion.

#### Recommendations For Further Study

In assessing exercise participation choice behaviors, it is instructive to recognize that successful health promotion efforts may be catalytic in generating general shifts in attitudes and practices with regard to health and wellness. The following recommendations for future worksite

wellness promotion research have been identified as a result of this investigation:

First, additional research employing experimental or ex-post-facto experimental designs are much needed to determine economic effectiveness and human benefits of workplace wellness promotion programs. Researchers must not be bound to the impracticalities of true experimental design in making decisions to evaluate or not to evaluate wellness. Given the numerous potential tangible and intangible benefits to employers and workplace wellness promotion evaluation should be as concerned with controlling beta error as they are with controlling alpha errors in test design. Unless this occurs, the risk of prematurely canceling potentially profitable program outcomes and investments is highly probable.

Secondly, too many relationship studies between exercise and stress, mental health, cognitive functioning, job satisfaction, productivity, and other cost-related work factors have employed a non-integrated approach. Emphasis of the topic to be researched has depended upon what variable assumes the greatest importance to the employer. The non-integrative approach has failed to identify the value of exercise wellness programs in "totality." Thus, future program evaluations must be conducted using behavioral models in an integrated manner with a financial model. Therefore, research evaluation must simultaneously



assess program effectiveness using both the human benefits and economic merit components.

Thirdly, human benefits cannot accrue, and hence cannot be evaluated, if employees do not make choices to participate when exercise wellness programs are available to them. More research is needed to determine what specific factors influence employees' decisions to begin an exercise program in the work place. Do factors such as degree of satisfaction with current health status or the presence of health risk conditions such as overweightness, smoking, high blood lipids and persistent stress have any significant role? There is a need to apply existing models or develop new models to more definitively factor out determinants of exercise participation behaviors in the work environment. To this end, research endeavors must include testing and validating a risk factor bio-psychological dichotomized model to predict employees' exercise participation.

Fourth, work place wellness programs should remain a central focus for years to come. A major determinant, however, will be employees' initiation and adherence behaviors. The number of employees who utilize the programs on a regular basis will forcefully determine whether employers make decisions to continue existing programs or implement future programs. From this stance three areas in work site health promotion should be studied in future research efforts: 1) Factors that influence compliance and

non-compliance to an exercise participation regime over time; 2) employer/organizational characteristic relating to employee participation; 3) effective or ineffective recruiting efforts; and 4) health-promotion structuring for a diverse work force.

Fifth, one aim of occupational wellness promotion programs is to implement activity components to mediate or reduce work-related stress. It would be instructive, then, to identify those work environments in which the intensity, duration and frequency of employees' exposure to stress is the most or least abundant. Research is recommended in this area to document the value of work-based exercise programs in stress reduction by studying subjects from two contrasting work environments.

Sixth, research literature indicates that the outcomes of workplace exercise wellness program areas are unclear and that conceptual issues cloud the questions. Related literature fails to give a broad and accepted definition of what constitutes an exercise wellness program, or what terms best describe physical activity, exercise, and physical fitness. The study of any problem or event requires that the central topics under investigation be defined and then accurately measured.

Physical activity, exercise, and physical fitness have been used by researchers to describe the same or different concepts. The terms have often been confused with one

another and have sometimes been used interchangeably. Therefore, definitions that offer an interpretational framework for comparing studies that relate to physical activity, exercise, and physical fitness must be developed. When each term is operationally defined, findings of studies can be most accurately interpreted, measured, generalized and applied with regard to the problem being investigated. Moreover outcomes of exercise wellness program become more clear and rates of health promotion occurring in the work place becomes more precise.

Finally, legal constraints and existing confounding factors such as selection bias, contaminating activities, small sample size, and short time responses, are commonly associated with work place wellness program research. Research studies, then, must be designed to control these variables statistically and to analyze multiple dependent and independent variables during a single research effort. Such design yields more robust studies more substantial data, and data that permit greater generalizability.

### Summary

This study has focused on physical exercise and its relationship to employees' psychological wellness. More specifically, the study analyzed the effects of exercise participation on employees mood states and job satisfaction and found that higher levels of physical exercise

participation was related positive psychological mood states. High degrees of job satisfaction were also found to be related to high levels of physical exercise participation. In addition, the mood states of Tension and Anger as well as Total Mood Disturbance score (global indication of mood) all improved during the course of this study.

A causal link between the exercise participation variable and psychological measure was not investigated. However, the significant difference found in positive mood states and higher job satisfaction between the control (sedentary groups) and the treatment (exercise participating groups) suggest that human benefits in the form of psychological wellness are gained from regular exercise participation. Therefore, employers should view the continuation of the workplace exercise component as a valuable wellness intervention by which to buffer employees from the deleterious response to constant and increasing occupational stress. Five recommendations were described that would seem to add to available data and provide new data with regard to the exercise participation wellness relationship.

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## Appendix A

CONSENT FORM

You are invited to participate in a non-threatening reserach study to determine the effect of your regular exercise participation upon psychological mood states, job stress, and exercise compliance. You, as a member of the College community and CommonHealth, were selected as a possible participant because of the benefits and successes of previous CommonHealth classes. There will be approximately 150 adults in the total study.

If you decide to participate, you will be responding to three short paper and pencil inventories at various times during the next eight weeks. These inventories are:

PROFILE OF MOOD STATES

SELF-REPORT INVENTORY

OCCUPATIONAL STRESS SCALE

The inventories are quite short and require very little effort your part. Most of the information can be collected just before or immediately following your exercise session.

You are not obligated to participate in this study and you may refuse to answer any questions or withdraw from it at any time. All information will be treated as confidential and will not be disclosed to anyone without your stated permission.

If you have any questions, please ask us. If you have any additional questions later, Dr. Christina Jackson (253-4577) will be happy to answer them. You will be offered a copy of this form to keep.

---

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate. You may withdraw at any time without prejudice after signing this form should you choose to discontinue participation in this study.

---

Signature

---

Date

---

Signature of Witness

---

Signature of Chief Investigator

## Appendix B

**DEMOGRAPHIC SURVEY  
PHYSICAL ACTIVITY INDEX/COMMONHEALTH  
COLLEGE OF WILLIAM & MARY STUDY**

In order for us to better analyze and understand our data a general indication of your physical exercise and activity is needed. Please take a moment to indicate (in your judgement) you appropriate index for two months ago as well as for right now.

Date: \_\_\_\_\_

Name: \_\_\_\_\_ OR

SSN: \_\_\_\_\_

2 Months      Now  
Ago

- |       |       |   |
|-------|-------|---|
| _____ | _____ | 1. Inactive: no regular exercise; sit down job.                                       |
| _____ | _____ | 2. Relatively inactive: no organized activity: 3-4 hours walking or standing per day. |
| _____ | _____ | 3. Light activity: sporadically, recreational activity.                               |
| _____ | _____ | 4. Moderate activity: 30 to 60 minutes, three times per week.                         |
| _____ | _____ | 5. Vigorous activity: 60 minutes or more at least four times per week.                |

Comments may be noted if a change has occurred:

---



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---

Please return this form to the CommonHealth Office, Adair Gym.

**TELEPHONE FOLLOW-UP VERIFICATION - COMMONHEALTH  
COLLEGE OF WILLIAM & MARY STUDY**

Hello \_\_\_\_\_, this is \_\_\_\_\_ of  
the College's CommonHealth office. In order for use to  
verify data from our recent study, we need to check on  
several bits of information.

Date: \_\_\_\_\_

Name: \_\_\_\_\_ OR

SSN: \_\_\_\_\_

Present Weight: \_\_\_\_\_ Height: \_\_\_\_\_

Age Group:	_____ 20-25	_____ 46-50
	_____ 26-30	_____ 51-55
	_____ 31-35	_____ 56-50
	_____ 36-40	_____ 61 and above
	_____ 41-45	

Your Activity Status:

2 Months  
Ago

Now

- |       |       |   |
|-------|-------|---|
| _____ | _____ | 1. Inactive; no regular exercise; sit down job.   |
| _____ | _____ | 2. Relatively inactive; no organized activity; three to four hours walking or standing per day. |
| _____ | _____ | 3. Light activity; sporadically, recreational activity.   |
| _____ | _____ | 4. Moderate activity: 30-60 minutes, three times per week.                                      |
| _____ | _____ | 5. Vigorous activity: 60 minutes or more at least four times per week.                          |

Your significant comments may be noted if a change has occurred.

Job Position: \_\_\_\_\_

## Appendix C

**TELEPHONE FOLLOW-UP VERIFICATION - COMMONHEALTH  
COLLEGE OF WILLIAM & MARY STUDY**

Hello \_\_\_\_\_, this is \_\_\_\_\_ of the College's CommonHealth office. In order to verify data from our recent study, it is necessary to re-check several items of information.

Date: \_\_\_\_\_

Name: \_\_\_\_\_ OR

SSN: \_\_\_\_\_

Present Weight: \_\_\_\_\_ Height: \_\_\_\_\_

Age Group:	_____ 20-25	_____ 46-50
	_____ 26-30	_____ 51-55
	_____ 31-35	_____ 56-50
	_____ 36-40	_____ 61 and above
	_____ 41-45	

Your Activity Status:

2 Months  
Ago

Now

- |       |       |   |
|-------|-------|---|
| _____ | _____ | 1. Inactive; no regular exercise; sit down job.   |
| _____ | _____ | 2. Relatively inactive; no organized activity; three to four hours walking or standing per day. |
| _____ | _____ | 3. Light activity; sporadically, recreational activity.   |
| _____ | _____ | 4. Moderate activity: 30-60 minutes, three times per week.                                      |
| _____ | _____ | 5. Vigorous activity: 60 minutes or more at least four times per week.                          |

Your significant comments may be noted if a change has occurred.

Job Position: \_\_\_\_\_

## Appendix C (continued)

<u>CommonHealth</u>		<u>Non-CommonHealth</u>	
<u>      </u>	1. Non-exerciser (NEP) Exerciser	<u>      </u>	5. Regular
<u>      </u>	2. Outside Worksite (OEP)	<u>      </u>	6. Non-regular exerciser
<u>      </u>	3. Inside Worksite		
<u>      </u>	4. Intra-Extra		



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