

Student Work

---

8-1988

## The effect of a corporate fitness program on worker productivity

Joseph A. Leutzinger

Follow this and additional works at: <https://digitalcommons.unomaha.edu/studentwork>



Part of the [Health and Physical Education Commons](#), and the [Kinesiology Commons](#)

Please take our feedback survey at: [https://unomaha.az1.qualtrics.com/jfe/form/SV\\_8cchtFmpDyGfBLE](https://unomaha.az1.qualtrics.com/jfe/form/SV_8cchtFmpDyGfBLE)

---

### Recommended Citation

Leutzinger, Joseph A., "The effect of a corporate fitness program on worker productivity" (1988). *Student Work*. 3056.

<https://digitalcommons.unomaha.edu/studentwork/3056>

This Thesis is brought to you for free and open access by DigitalCommons@UNO. It has been accepted for inclusion in Student Work by an authorized administrator of DigitalCommons@UNO. For more information, please contact [unodigitalcommons@unomaha.edu](mailto:unodigitalcommons@unomaha.edu).

THE EFFECT OF A CORPORATE FITNESS PROGRAM  
ON WORKER PRODUCTIVITY

A Thesis

Presented to the

School of HPER

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Physical Education

University of Nebraska at Omaha

by

Joseph A. Leutzinger

August 1988

UMI Number: EP73272

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI EP73272

Published by ProQuest LLC (2015). Copyright in the Dissertation held by the Author.

Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against unauthorized copying under Title 17, United States Code



ProQuest LLC.  
789 East Eisenhower Parkway  
P.O. Box 1346  
Ann Arbor, MI 48106 - 1346



THESIS ACCEPTANCE

Acceptance for the faculty of the Graduate College,  
University of Nebraska, in partial fulfillment of the  
requirements for the Degree Master of Science in Physical  
Education, University of Nebraska at Omaha.

Committee

Name

Department

*David Skulley*

*HYPER*

*James M. Thomas*

*Psychology*

*Daniel Blanke* AM.

Chairman

*August 3, 1988*

Date

#### ACKNOWLEDGMENT

This research was partially funded by the University Committee on Research at the University of Nebraska at Omaha and the Union Pacific Railroad. A special thanks to Patrick Budin, Executive Director of the Union Pacific Fitness Center, and Candace Huey, Industrial Psychologist at Union Pacific for their assistance and encouragement and Dr. William Rudman who gave me written permission to use part of his questionnaire and initially helped me to organize my study.

TABLE OF CONTENTS

LIST OF TABLES . . . . . iii

Chapter Page

1. INTRODUCTION . . . . . 1

2. STATEMENT OF THE PROBLEM . . . . . 4

3. REVIEW OF LITERATURE . . . . . 6

4. METHODS . . . . . 31

5. RESULTS . . . . . 35

6. DISCUSSION . . . . . 48

Appendix

1. FITNESS CENTER SURVEY . . . . . 57

WORKS CITED . . . . . 62

LIST OF TABLES

Table	Page
1. Frequency Distribution in Percentage of Respondents and Mean Responses of Fitness Center Members and Non-members Stating Measures of Employees Perceptions of the Fitness Center . . . . .	37
2. Frequency Distribution in Percentage of Respondents and Mean Responses of Fitness Center Members and Non-members Concerning the Importance of the Fitness Center to Employees . . . . .	38
3. Frequency Distribution in Percentage of Respondents and Mean Responses of Fitness Center Members and Non-members Concerning the Relationship Between Regular Exercise and Work Productivity. Regular Physical Exercise Would Help Me To: . . . . .	40
4A. Regression Results Outlining the Effects of Education, Race, Age, Sex, Tenure, Occupation, Marital Status, Income and Participation/Adherence on Employee Perceptions of the Fitness Center. Dependent Variable: Perception of the Fitness Center . . . . .	44
4B. Regression Results Outlining the Effects of Education, Race, Age, Sex, Tenure, Occupation, Marital Status, Income and Participation/Adherence on the Perceived Importance of the Fitness Center . . . . .	45
4C. Regression Results Outlining the Effects of Education, Race, Age, Sex, Tenure, Occupation, Marital Status, Income and Participation/Adherence on the Relationship Between Exercise and Work Productivity. Dependent Variable: Relationship Between Exercise and Work Productivity . . . . .	46



## CHAPTER ONE

### Introduction

Other parts of the world, namely Europe and Asia, are out producing the United States. According to Steers & Porter (1987), the U.S. ranked sixth among seven leading industrial nations in productivity increases from 1968-1978. An unhealthy life-style is one factor causing decreased productivity in the U.S. (Cox, Shephard & Corey, 1981). Fitness level, work capacity, mental fatigue and stress are related to life-style and have an impact on productivity (Falkenberg, 1987). It is estimated that two-thirds of all businesses in the U.S. with fifty or more employees offer some type of health promotion program (McLemore & Dolzier, 1987). These programs are established in hopes of positively affecting those variables related to productivity.

Exercise is the foundation of the majority of health promotion programs because fitness level affects productivity. The benefits of participating in a corporate health promotion program in terms of physiological benefits have been well documented. Decreases in percent body fat, resting heart rates, blood pressure and blood cholesterol have all been cited as physiological benefits of exercise (Cooper, Pollack, Martin, White, Linnerud, & Jackson, 1976;

Durbeck, Heinzelman, Schacter, Haskell, Payne, Moxley, Nemiroff, Limoncellis, Arnoldi, & Fox, 1972; Fox & Skinner, 1974; Young & Ismail, 1977).

Decreased work capacity, mental fatigue, stress and anxiety are other factors that affect productivity (Folkins, Lynch & Gardner, 1972). Exercise has been documented as having an affect on all of these, therefore also having an impact on productivity (Folkins et al., 1972; Gutin, 1966; Hughes, 1984).

Besides the physiological benefits of exercise or employee health indicators, research concerning health promotion programs has focused mainly on the benefits from reduced health care costs and reduced absenteeism (Baun, Bernacki & Tsai, 1986; Bjurnstrom & Alexiou, 1978; Bly, Jones & Richardson, 1986; Bowne, Russell, Morgan, Optenburg & Clarke, 1984; Cox, Shephard & Corey, 1981). Chenoweth (1983) recognizes these and similar benefits such as productivity as organizational health indicators.

Rudman (1987) points out that improved productivity is one of the four primary areas of concern that provide rationale for the initiation of a health promotion program. The relationship between employee productivity and onsite health promotion programs has not been widely studied (Rudman, 1987). The research that has been done in this area suggested that participating in an employee fitness

program can improve productivity and help reduce fatigue at work (Heinzelman & Bagley, 1970; Rhodes & Dunwoody, 1980; Yarvote, McDonagh, Goldman & Zuckerman, 1974).

Bernacki and Baun (1984) concluded that there is a relationship between job performance and exercise adherence in a corporate fitness program. Moreover, Rudman (1987) suggested that a health and fitness center has a positive effect on workers' attitudes.

Although most of these results are positive, Falkenberg (1987) mentioned that the majority of these studies used subjective comments, rather than objective measures. However, if self-perception is seen as productive, then this positive attitude may lead to increased productivity.

Obtaining objective data is not feasible in some worksites. Since most of the results from the studies in this area are positive, it becomes important to know when these changes in performance occur. Bernacki and Baun (1984) conducted their study after the health promotion program had been in operation for six months while Rudman's (1987) research was conducted after the center had been open for five years. Both studies recommended that research be conducted in between these two time frames. The purpose of this study was to determine if a corporate health promotion program enhances employees' perception of work productivity after the first nine months of operation.

## CHAPTER TWO

### Statement of the Problem

#### Purpose

The purpose of this study was to determine if a corporate health promotion program enhances employees' perception of work productivity after the first nine months of operation.

#### Research Hypothesis

Regular participation in a corporate fitness facility will enhance employees' perception of work productivity after it has been opened for a nine month period.

#### Delimitations

All 4,047 employees of the Union Pacific Railroad in the Omaha and Council Bluffs area were used as subjects.

#### Limitation

The limitations of this study were the subjective measure of one's work productivity and the inability to verify whether non-members participate in regular exercise. Voluntary participation in the study reduced the sample size and therefore the results do not reflect the attitudes of all employees.

#### Definition of Terms

Non-member. An employee who did not sign up for the Union Pacific Fitness Center.

Non-exerciser. An employee who did not regularly exercise.

Exerciser. An employee who exercised an average of less than once per week during the study period.

Frequent Exerciser. An employee who exercised an average of once or twice per week during the study period.

Active Exerciser. An employee who exercised an average of more than twice per week during the study period.

#### Significance of the Study

This study will help health promotion professionals and managers determine the value of a health promotion program on perception of work productivity, and that this result can take place within the first nine months.

## CHAPTER THREE

### Review of Literature

In the last two decades productivity rates and life-style behaviors have become more of a concern among employers in the U.S. Some researchers and managers have suggested that the two are interrelated (Cox, Shephard & Corey, 1981). Approximately 66% of all businesses in the U.S. with fifty or more employees offer some type of health promotion program (McLemore & Dolzier, 1987). These programs vary considerably in size and cost. The rationale behind implementing these programs has been numerous. Health promotion programs may help one achieve a higher level of fitness, thus reducing health care costs and absenteeism. Moreover, they could reduce physical and mental fatigue, and stress at work. Therefore health promotion programs may affect effort and productivity.

This review will examine research investigating factors related to productivity. These factors can be divided into two categories, employee health indicators and corporate health indicators (Chenoweth, 1983). The employee indicators are the physiological benefits associated with exercise, while the organizational health indicators include health care rates, absenteeism and productivity.

The first part of this review will examine research on the physiological benefits of exercise. The second part will look at studies relating health care costs and

absenteeism to corporations with health promotion programs. Work capacity, mental fatigue and stress are factors directly related to productivity (Folkins et al., 1972). The third section will focus on studies examining how these three variables influence productivity. Finally research on the relationship between corporate health promotion programs and productivity will be examined. A short review on the validity of self appraisals is contained inside this section because a self appraisal system will be used in this research.

#### Physiological Benefits of Exercise

It has been well documented that regular physical activity has definite physiological benefits (Yarvot, McDonagh, Goldman & Zuckerman, 1974). Regular exercise has an effect on such things as one's resting pulse rate, resting blood pressure, body fat percentage, body weight and blood cholesterol (Cooper, Pollack, Martin, White, Linnerud & Jackson 1976; Heinzelman & Bagley, 1976; Rhodes & Dunwoody, 1980; Siegel, Blomquist & Mitchell, 1970; Young & Ismail, 1977).

Rhodes and Dunwoody (1980) conducted a study to determine the physiological changes of those participating in an employee fitness program. After six months they reported that participants had significantly reduced their body weight and pulse rates, while their aerobic capacity ( $VO_2$  max) showed significant improvement. Heinzelman and

Bagley (1976) reported similar results. They concluded that regular exercise and positive effects on such health related factors as increased stamina, weight loss, ability to cope with stress and tension and an overall better feeling about themselves. Heinzelman and Bagley (1976) also concluded that physical activity influenced one's attitudes toward work, as well as work habits and work performance.

Siegel et al., (1970) had nine subjects exercise three times per week for five weeks on a bicycle ergometer. Their results showed decreased serum cholesterol and triglyceride levels and significantly increased maximum oxygen uptake. A study by Pollack, Broida, Kendrick, Miller, Janeway and Linnerud (1972) also reported similar results on a group of twenty-two men who ran for two days per week, forty-five minutes per session. Young and Ismail (1977) also conducted a study among regular exercisers. They reported that those who exercised on a routine basis experienced a significantly lower percent body fat, lower resting heart rate and a higher  $\text{VO}_2$  max than the other two groups who did not regularly exercise (Heinzelman & Bagley, 1976; Rhodes & Dunwoody, 1980; Siegel et al., 1970; Young & Ismail, 1977).

Therefore providing a fitness program at the workplace may have similar results in terms of the effects of exercise on physiological variables. Moreover, as more corporations



recognize the benefits of regular exercise, the opportunity to incorporate health promotion during the workday will become more prevalent.

#### Health Care Costs

O'Donnell and Ainsworth (1984) reported that in 1982, \$247 billion was spent on health care. Third parties paid two-thirds of this bill. Horowitz (1987) predicts that approximately 90 percent of health care costs are preventable. Because poor health affects productivity, and employers pay such a large percentage of the health care bill, they are constantly looking for ways to reduce its impact and expense. It is suggested that health promotion programs may reduce health care costs.

Bowne, Russell, Morgan, Optenberg and Clarke (1984) conducted a study among participants of Prudential's worksite fitness program. Bowne et al., (1984) examined major medical and disability costs for the group one year before the program started and one year after its implementation. The results showed that those with a higher fitness level one year after the program was implemented had lower major medical and disability costs. Bowne et al., (1984) estimated savings of \$1.93 for every dollar invested in this program.

Gibbs, Mulvaney, Henes and Reed (1985) investigated health care costs among participants and nonparticipants of a health care promotion program at Blue Cross and Blue

Shield of Indiana. They looked at claims and money paid for ambulatory and hospital procedures. The program offered educational classes on many wellness topics and a health screening for all participants. Results showed that participants averaged more claims and higher payments than the control group. However, it was speculated this was due to an increased awareness caused by the initial screening process.

Gibbs et al., (1985) selected a random sample from all subjects in the Blue Cross Blue Shield of Indiana study. He followed the smaller group over a four-year period. The results this time showed a \$410.09 average yearly reduction in health care costs per participant. Therefore it was hypothesized that wellness programs pay off after an initial period of higher costs.

Baun, Bernacki and Tsai (1986) conducted a study at Tenneco, Inc. comparing the medical care utilization rates among exercisers and non-exercisers in an employee fitness program after the first full year of operation. They reported the overall medical care costs between the male employees, non-exercisers vs. exercisers, was approximately double for the non-exerciser group (\$1,003 vs. \$561). The results for the female group were similar (\$1,539 vs. \$639).

The impact of a health promotion program on health care costs and utilization was conducted over a five year period at Johnson and Johnson (Bly, Jones & Richardson, 1986). The

Johnson and Johnson program, called Live for Life, is a comprehensive health promotion program aimed at helping individuals develop and maintain healthy life-styles. The Live for Life program advocates exercise but a fitness facility is not provided for the employees of Johnson and Johnson. The subjects (n=3,259) were divided into three groups. Groups one and two were participants in the Live for Life program for more than 30 months and between 18 and 30 months, respectively. Group three subjects did not participate in the Live for Life program. Results showed group three's cost and utilization rates began to exceed those in the other two groups after the fourth year with great differences occurring in the fifth year. Cost differences between groups one and three were significant while no significant differences were found when comparing groups one to two or two to three.

Control Data Corporation offers its employees a comprehensive health promotion program called Staywell. It consists of such things as individual health risk profiles and risk reduction courses to help one maintain life-style changes (Anderson & Jose, 1987). Control Data has developed an extensive program evaluation model since its implementation in 1979. Results showed an average reduction of \$83 in health care costs per employee in the study.

These studies (Anderson & Jose, 1987; Baun et al., 1986; Bly et al., 1986; Bowne et al., 1984) all suggested that health promotion and physical fitness programs can affect health care costs and utilization rates. Some of the limitations of the studies were small non-random samples and estimated rather than actual savings and cost increases over the study periods. However, the studies did involve a variety of work settings, sub populations and intervention techniques covering a wide range of worksite settings.

#### Absenteeism

An assumption is made that increased fitness levels will reduce absenteeism because enhanced fitness will improve health, and healthier employees are less likely to be absent. Cox, Shepherd and Corey (1981) conducted a study among high, low and nonactive participants to see if involvement in a fitness program reduced absenteeism rates.

Two large Canadian Assurance Companies in Toronto agreed to participate in the study. Cox et al., (1981) looked at the rates three months prior and six months after the program was implemented. The experimental group contained 1,281 employees while the control group was made up of 577 employees. The results from this study showed that the high level participants decreased their absenteeism rate significantly during the study period. The absenteeism rate was 22% less than either the low level or nonactive participants.

Youngblood (1984) hypothesized that absenteeism is related to the degree of attachment to work and nonwork, and that the amount of commitment to each will determine the time allocated to each. Therefore, employee fitness programs may only reduce absenteeism rates for people who either place a higher value on participation in physical exercise, so they come to work, or highly value both exercise and work.

#### Work Capacity and Mental Fatigue

Productivity is another organizational health indicator. It is sometimes difficult to measure. However it is suggested that the ability to increase work capacity, prolong the onset of mental fatigue and stave off stress and its related states will result in greater productivity.

Work capacity and mental fatigue are the first two factors directly related to productivity. The organism is a single unit; the mind and body are not separate, rather the enhancement or inhibition of one reflects the competency of the other. The ability to physically work harder at a lower  $\dot{V}O_2$  max (maximal aerobic capacity) percentage is a benefit of enhanced fitness. According to Falkenberg (1987) an increased capacity for physical work from improved fitness will translate into an ability to work harder and longer at the office. This may positively affect productivity because

the transfer from physical to mental capacity is expected to enhance the ability to maintain higher levels of concentration and mental effort.

Folkins, Lynch and Gardner (1972) conducted a study among junior college students enrolled in a jogging class to see if psychological fitness was a function of physical fitness. The subjects were given physical and psychological tests prior to and after the course. Measures of psychological fitness were also performed on a control group. The results showed that the men and women of the experimental group improved in physical fitness, and that significant changes in psychological fitness occurred but only for the women. This study does not demonstrate a cause-effect relationship, but the correlation in data showed that the greater the decrease in the 1.75 mile run time, the more likely it was for the subject to become less depressed, more confident and more efficient at work.

The purpose of a study by Butler (1969) was to determine the effects of physical conditioning and exertion on the performance of a simple mental task. Prior to and upon completion of a ten week physical conditioning program, both the experimental and control group took a simple mental task test. The control group sat quietly at their desks prior to the test, while the experimental group was exposed to a three item physical fitness test before taking the exam. The results from this study concluded that near

maximal exertion on a three item physical fitness test does not significantly affect performance of a simple mental task after a ten week physical conditioning class.

Lichtman and Poser (1983) examined the effects of exercise on cognitive functioning. They investigated empirical changes in mental functioning as a result of a short exercise period. One-half of the 64 subjects participated in a physical exercise class while the remainder enrolled in a hobby class. The Stroops Color and Word Test (Golden, 1978) was administered to ten subjects in each group. It taps basic psychological processes useful in the study of cognitive processes. The results of this study revealed that the experimental group scored significantly higher on the Stroops Word Test in both the pre and post test, and significantly higher on the color sheet in the post test. Therefore, Lichtman and Poser (1983) suggested that the improvements in scores reflected an increased alertness and physical well-being associated with exercise.

Rhodes and Dunwoody (1980) assessed the effects of participating in a six month corporate fitness program on psychological factors. Forty male workers from a large Vancouver-based company served as the experimental group, while fourteen subjects volunteered to be used as controls. The experimental group took a series of physiological tests including cardio-respiratory, pulmonary function, body assessment, flexibility and strength exams. The exercise

class met three times per week for approximately one hour each session. After six months, the experimental group improved significantly on many of the physiological tests when compared to the control group.

A questionnaire on the psychological benefits and attitudinal changes derived from the exercise program was completed by the experimental group. The results from the questionnaire showed that general attitudes toward work performance improved. Some of the benefits cited from the program were an increased ability to concentrate, physically work harder, handle job tensions and related stress, and approach a job with a more positive outlook and self confidence.

Although involvement in worksite exercise programs seems to have several direct and indirect effects on health habits and behaviors, more research definitely needs to be done in this area. The aforementioned studies suggest that an increased fitness level may improve one's ability to perform cognitive tasks. However, the applications of the results to the workplace are limited. For example, the type of work performed is a key concern. The ability to perform a simple mental task after physical exertion could be applied to some blue collar worksites. However, a gap in the literature is evident since many jobs require mental effort over 7-8 hour periods. An analysis of the impact of



physical exercise on cognitive effort extended over this time period is needed before any conclusive results can be reported.

### Stress

Stress and its related states (i.e., tension or anxiety) also have an impact on performance. Modern man must look for ways to minimize the detrimental effect of stress on productivity. It is hypothesized that the effect of fitness on productivity stems from the interaction between the state of the physiological system and the specific requirements of the task. Therefore, the stress response of a fit individual is substantially less for a given physical workload than that of a less fit person. If one is then able to transfer this to mental work, the stress response of a fit individual will be reduced for a given cognitive load. Moreover, it is recommended that complex motor or mental tasks be performed under low arousal levels.

Weingarten (1973) pointed out that a person in good physical condition should be better able to perform complex mental tasks especially under stressful conditions.

Gutin (1965) tested the hypothesis that a relationship exists between an increase in fitness and an increase in mental ability following stress. Fifty-five college students were divided into two groups. Both groups were administered a series of tests from the Employee Attitude Survey (EAS) immediately after a 45-minute stress period of

moderate intensity. The experimental group then participated in a twelve week physical fitness class. Following the term the two groups completed the same portions of the EAS after an identical stress period. The results from the study supported the research hypothesis. There was a definite group relationship between an increased fitness level and the degree of improvement in the ability to perform complex mental tasks following a period of physical and mental exertion.

In another study by Hammerton and Tickner (1968) the comparative effect of vigorous physical activity between extremely fit and ordinary British soldiers performing skill tasks of moderate and difficult degrees were examined. The results showed that following 400 seconds of vigorous cycling the ordinary soldiers showed no decrease on the task of moderate difficulty, but a considerable decrement on the task of great difficulty. The extremely fit subjects showed no decrease in performance on either task.

These studies (Gutin, 1965; Hammerton & Tickner, 1968; Weingarten, 1973) suggested that the groups with relatively higher fitness levels were less fatigued and consequently enjoyed a more rapid physiological recovery during the mental performance period.

Weingarten (1973) examined the ability to perform mental tasks during physiological exertion as a result of improved fitness. A direct maximal aerobic capacity test

was administered to all thirty subjects. All participants then answered the Raven Progressive Matrices (1960) Abstract Thinking Test. Prior to answering the questions, the subjects walked on a 15% graded treadmill for four minutes at a constant speed of 5.6K per hour. The experimental group (n=15) then took part in a seven week physical conditioning class. At the end of this period, both groups received the same testing as performed prior to the class. The results of this study showed that as the questions became progressively more difficult, differences between the groups grew gradually larger in favor of the experimental group. This study indicates that fit individuals are better able to handle stressful mental tasks, especially during more difficult situations.

An ability to handle stress appears to affect performance. A better conditioned individual may become less physiologically aroused when faced with a stressful situation. The body virtually reacts the same regardless of whether the stress is mental or physical. Therefore, it seems logical that when performing a complex motor task it is advantageous not to exhibit too great a stress response (Weingarten, 1973).

Several factors have been identified that have an effect of job performance. Although the research conducted on each variable is inconclusive, most may agree that work capacity, cognitive functioning, stress and its related

states all have some affect on productivity. Moreover, exercise may be able to increase or inhibit these variables appropriately leading to an enhanced performance capability.

### Productivity

Knowing what will make an employee exert a high effort is a key issue in understanding productivity. Howard and Mikalachki (1979) proposed a model relating exercise/fitness to productivity. The model is based on their research and the literature available on the topic at that time. Howard and Mikalachki (1979) identified four general pathways that may explain the link between fitness and productivity. The first two pathways identify the factors of better health and its effects on turnover and absenteeism. The third focuses on attitudinal variables that may affect productivity, and the fourth pathway involves the issues of energy and fatigue.

Their first pathway is based on the assumption that increased fitness will delay mental and physical fatigue. This assumption is supported by research mentioned earlier (Folkins et al., 1972; Lichtman & Poser, 1983). Howard and Mikalachki (1979) also pointed out that the job requirements and the relationship between mental and physical fatigue affected the relationship between fitness and productivity. These days most jobs and occupations require a minimal fitness level to perform the work. However, it seems possible that exercise and a higher level of fitness may

allow a person to better handle mental fatigue (Folkins, Lynch & Gardner, 1972; Lichtman & Poser, 1983). Therefore, occupations with the potential for high levels of mental fatigue are more likely to demonstrate a relationship of exercise/fitness to productivity.

The second part of the Howard and Mikalachki (1979) model looked at how employee feelings and attitudes influence productivity. An individual who has an improved level of health may develop a more positive self-image. An enhanced self-image may influence productivity through improved health.

The next two pathways identify two ways health directly influences productivity. The first is in the ability to attend work, while the other is related to the length of the work cycle. Absenteeism is the main focus of this pathway. It affects productivity directly due to a less experienced person or no one doing the job, or indirectly, due to the excess work force carried in anticipation of absenteeism. Even in the short run, absenteeism significantly reduces productivity (Howard & Mikalachki, 1979).

Exercise/fitness effects on productivity will be specifically related to the individual's job or occupation group. Occupations most likely to benefit from health promotion programs are those with a high degree of mental and physical fatigue (Howard & Mikalachki, 1979). Howard and Mikalachki (1979) suggested that adequate control groups

must be used in research which determine the effects of health promotion programs on productivity. Also, they pointed out that research conducted on short-term programs should consider the possible long-term effects.

One of the objectives in a study by Durbeck et al., (1972) was to determine the effects of a health promotion program on behaviors and attitudes toward work and health. Men who were directly employed by the National Aeronautics and Space Administration (NASA) between the ages of 35 to 55 and who had a General Services pay rating of 11 or higher volunteered to be subjects. Each participant received a baseline evaluation of their current health status. Personal interviews and self-administered questionnaires were used to collect sociopsychologic data on the subjects' health attitudes, habits and practices.

All subjects were given educational sessions to teach them about basic exercise physiology, program policies and how to take their pulses. They were advised to exercise three times per week for thirty minutes each session at a heart rate equal to 85 percent of their maximal predicted heart rate; provided they did not have a positive treadmill test during the base line evaluation. Approximatley twelve months from the start of the program the sociopsychological factors were reassessed. For the 259 subjects the mean attendance rate was about half of that prescribed. There were some physiological changes that occurred for the

participants (i.e., resting heart rate, skinfold measurements, body weight) but they were not significant. This was probably due to the low mean attendance among the group.

An assessment of the program's effects on health attitudes and behaviors was also part of the post evaluation. A self administered questionnaire was used to determine whether participants believed the program had influenced work, health status, habits or behaviors. A strong correlation existed between work performance and attitudes toward the job. Participants reported that they could work harder both mentally and physically, found their job less boring and had a higher level of enjoyment for their work. Changes concerning health included reduced stress and tension and greater stamina.

To test the validity of the self reported data, multiple comparisons were made between the reported and measured effects. Those who reported greater stamina took longer to reach a heart rate of 140 beats per minute during the repeat treadmill test. Participants who reported weight loss had lost weight. Therefore, the self reported program effect seemed to have some validity. The changes or effects reported by the participants were said to be due to taking part in the program. Therefore, participation in a health

promotion program can affect a person's actions and views about such programs. Improvements in longevity or work performance can not be substantiated by this study.

A study by Cox, Shephard and Corey (1981) cited earlier concluded that the fitness programs at the Canadian Assurance Companies influenced motivation and loyalty among employees. Cox et al., (1981) realized that it is difficult to establish a link between programs and performance, but the general attitudinal comments of the participants from their study suggested a greater enjoyment of their work. Therefore, the study by Cox et al., (1981) indicated that health promotion programs have potential economic benefits (Cox, Shephard, & Corey, 1981).

Bernacki and Baun (1984) investigated the relationship between varying degrees of adherence to a corporate fitness program and job performances. An established supervisors' rating system was used to assess performance. The study population consisted of 3,231 white collar Tenneco, Inc. employees which were divided into four job categories: management (561), professional (1,265), clerical (1,078), and other (327). Participants were also divided into five exercise adherence groups: Non-member (1,090), non-exerciser (926), exercised less than one time per week (738), exercised one to two times per week (328), and exercised more than two times per week (239). The personnel department then reported the supervisor's current job



performance rating to all individuals within each occupational and adherence category. Three performance categories were used (above average, average and poor).

During the study an average of 1,537 white collar workers participating in a corporate health and fitness program recorded their exercise activity each month. The results of this study suggested that those with above average job performance demonstrated high exercise adherence. Those with poor job performance demonstrated low exercise adherence.

These results suggested an overall association between job performance and exercise. The authors (Bernacki & Baun, 1984) plan to evaluate these findings over a longer period of time. Falkenberg (1987) in a review of similar research noted that the Bernacki and Baun (1984) study was well controlled because they used objective rather than subjective measures of performance. However supervisor ratings are not truly objective measures of performance. Objective performance measures are difficult to obtain at all worksites.

People are often asked to evaluate their own behavior. Therefore, the use of self appraisals as a source of performance information is an established practice (Farh, Webel, & Bedeian, 1988). However, skepticism surrounds the use of self appraisals as an accurate measure of performance for two reasons: one is that self appraisals are subject to

self-enhancement desires and two, most people are perceived as not being able to accurately judge themselves to provide accurate information (Anderson, Warner & Spencer, 1984). A study by Farh and Webel (1986) suggested that self appraisals conducted for research purposes were less lenient than those conducted for the purpose of distributing rewards.

A recent investigation by Farh, Webel and Bedeian (1988) studies a self appraisal-based performance evaluation that incorporated self appraisal into more traditional forms of evaluation. Farh, et al., (1988) also examined its effectiveness for validity and acceptance.

The study sample consisted of 88 full-time faculty members. The annual performance appraisal used in the Farh et al., (1988) study was based on all scholarly activities during the previous fifteen months. Subjects completed an activity report and self rating. These documents were then returned to their respective chairmen who rated the faculty members in their department, using an identical rating form. The results from the study suggested that self and chairperson appraisals were not significantly different. Moreover, self ratings were highly congruent with supervisor ratings. They were found to be just as dispersed and no more lenient than supervisor ratings on the reported performance dimensions.

The previous results indicate that a self appraisal performance evaluation is a proven successful alternative to traditional supervisor prepared performance evaluations, at least for the focal samples. Farh, et al. (1988) suggested that the results of their study may be applied to research situation.

Rudman (1987) studied how the initiation of a worksite health promotion program affected the social dynamics of the workplace and worker productivity. A mail-in questionnaire and an interview was used on two different samples. Both members (n=236) and non-members (n=229) of the health and fitness center were sent surveys, while approximately thirty personal interviews were conducted on a selected sample of both members and non-members of Campbell Soup's health and fitness center.

The results of this study indicated that the majority of workers had a positive attitude toward both their jobs and the workplace. In terms of the relationship between exercise and productivity, 80 percent of the workers believed that regular participation in an exercise program would improve personal work productivity. Also, approximately 45 percent thought regular exercise helped them relate better to co-workers, enhanced concentration on work tasks, and relieved work related tension. A related response from personal interviews was that the health and fitness center and the child care center were the two

company programs that most enhanced the company's image. The results from both data sets suggested that the impact of a worksite fitness program extended beyond its members. However, those who did use the facility believed they were more productive at work, and experienced other positive social dynamic benefits.

Rudman (1987) noted that a limitation to this study was the inability to factor out the effect of the fitness center in relation to the other changes that occurred at this particular worksite. He also pointed out the need for research at a number of fitness centers at various stages of development to help further examine the relationship between health promotion programs and productivity.

Productivity is an area of concern for many U.S. companies. Some studies examined the relationship between productivity and participation in an onsite health promotion and found positive results. However many researchers recognize the need for more research in this area (Falkenberg, 1987; Howard & Mikalachki, 1979; and Rudman, 1987).

Productivity rates in the U.S. have been declining over the past twenty years (Steers & Porter, 1987). An unhealthy life-style is one factor responsible for this decline. Worksite health promotion programs may positively affect factors (work capacity, mental fatigue, stress, fitness level, health status and absenteeism) that directly or

indirectly impact productivity. Exercise is the foundation for the majority of health promotion programs because an increased fitness level is related to the organizational health indicators (health care costs, absenteeism and productivity).

The rationale behind implementing worksite health promotion programs is that reduced health care costs and absenteeism rates along with increased productivity may result. Studies (Anderson & Jose, 1987; Baun et al., 1986; Bly et al., 1986; Bowne et al., 1984; Cox et al., 1981; Gibbs et al., 1985) suggested that regular participation in a health promotion program will reduce health care costs and absenteeism. High health care costs are caused by poor health, and high absenteeism rates are generally associated with frequent illness and poor health. Therefore both health care costs and absenteeism indirectly influence productivity. Work capacity, mental fatigue and stress are factors that have a direct impact on productivity, while exercise has a positive influence on all of these factors (Butler, 1969; Falkenberg, 1987; Folkins et al., 1972; Gutin, 1965; Hammerton & Tickner, 1968; Lichtman & Poser, 1983; Rhodes & Dunwoody, 1980; Weingarten, 1973).

Limited research has been conducted on the relationship between health promotion programs and productivity (Rudman, 1987). The previous studies that have been performed show a positive relationship between these two variables.

Reviewing the literature seems to indicate that health promotion programs do have an effect on employee and organizational health indicators. Prior research on productivity and health promotion programs indicated that programs at different phases of development need to be studied. No research has examined employee perceptions concerning the practical use and value of health promotion programs and the relationship between exercise and worker productivity after a worksite fitness center has been operational for nine months. Without reliable results in this area, many onsite fitness programs may be based on erroneous assumptions which may lead to undesired outcomes and poorly designed programs. Therefore, measuring the effects of a short term fitness program on performance is an area where future research is needed.

## CHAPTER FOUR

### Methods

In September of 1987 an 8,000 square foot fitness facility was opened in the Union Pacific Railroad Headquarters building in Omaha, Nebraska. The Fitness Center is open to all 4,047 Union Pacific Railroad employees in the Omaha/Council Bluffs area. The center's main exercise area is equipped with twenty-one pieces of strength training equipment and twenty-five pieces of aerobic equipment. There is also a classroom used for educational classes and lunch lectures on various wellness topics, an aerobics room where supervised aerobics classes are offered, and men's and women's locker rooms.

The center is open more than 75 hours a week. Full-time instruction and supervision is offered in the main exercise room. Individualized exercise prescriptions and a variety of medical services including periodic cholesterol, pulmonary and blood pressure screenings are also offered. Exercise activity and vital signs are entered on a computer after each workout. Regular printouts provide the employee immediate feedback on his/her progress.

### Subjects

The study population consisted of all 4,047 white and blue collar employees of Union Pacific Railroad in the Omaha/Council Bluffs area.

### Instrumentation

The questionnaire used in this study was divided into four sections. The first section consisting of six questions asking employees their perceptions of an onsite health promotion program at work. Five items dealing with the perceived importance of an onsite health promotion program made up the next section. The third section containing seven items was used to determine the relationship between regular exercise and work productivity. The first three sections were obtained using a 5 point Likert scale ranging from strongly disagree (1) to strongly agree (5). The fourth section contained questions concerning the employees' background, job classification and exercise adherence category. Each employee identified their job category using one of the eight classifications. These were: officials and managers, professionals, technicians, sales, clerical, skilled craft workers, semiskilled operatives, and unskilled laborers. The employees also identified their exercise adherence category. Non-exerciser, exerciser, frequent exerciser, and active exerciser were the categories used. Membership status in the Union Pacific Fitness Center was also identified. On June 10, 1988 there were 1,225 members.



All 4,047 Union Pacific employees in the Omaha/Council Bluffs area were sent a survey questionnaire through the U.S. mail (See Appendix A). This survey is similar to the one used in the study by Rudman (1987).

Along with the questionnaire a return envelope was sent addressed to the U.P. Fitness Center in Omaha and a cover letter explaining that participation in this study is voluntary, anonymous and will have no effect on employee's job status within the company. The letter explained that the results of the study would be used to fulfill requirements for a Master degree thesis. Approximately one week later a follow-up letter was sent thanking those who returned the survey and encouraging others who had not. This research received Institutional Review Board and company approval. All data were collected during June of 1988.

#### Data Analysis

Differences between members and non-members were examined on measures of perceptions of the fitness center and exercise as well as productivity. Independent T-tests were used to determine significant differences between fitness center members and non-members on each question of every category. Tables were used to show a frequency distribution for each question and whether there was a significant difference at the  $p < .05$  level between members and non-members of the fitness center.

A linear regression was used to report the effects of age, sex, race, income, education, occupation, marital status, tenure, fitness center membership and exercise adherence on the three sections of questions previously identified.

## CHAPTER FIVE

### Results

Union Pacific is composed primarily of white upper middle class males. Employees who completed the survey were  $41.6 \pm 8.33$  years old and predominately white male non-agreement employees with 17.5 years of service. Except for the non-agreement status, this compared favorably with gender, mean age and tenure for all employees.

Questionnaires were received from 1,043 employees resulting in a return rate of 26%. Of those surveys returned, 539 (51.7%) were from members of the Fitness Center and 504 (48.3%) were from non-members of the Fitness Center. The return rate among non-agreement employees who are typically nonunion workers was 42%, while among agreement or union employees only 14% were returned.

It was recommended to Union employees by their local union presidents not to complete the survey. Although the study received company approval and the cover letter explained that the survey results were confidential and would have no effect on employees' job status, a number of union leaders still advised their members not to return the survey. Moreover, only part of the survey used in the study by Rudman (1987) was sent due to the political climate of Union Pacific at the time of the study. The questions which dealt with job and company satisfaction were eliminated at the company's request.

Table I shows the frequency distribution in percentage of respondents and mean responses between members and non-members concerning employee perceptions of the Fitness Center. The results in Table I suggest that the majority of employees returning the survey have a positive impression of the Fitness Center, believe it is open to all employees and feel that the center offers a variety of activities. Over 80% of all employees returning the survey disagreed with the statement that the Fitness Center is restricted to upper level management. Approximately 70% believe the Fitness Center is easily accessible, while over 80% somewhat agreed that the Fitness Center offered them an opportunity to interact with people outside their department. The responses between members and non-members were significantly different. Members had a better impression of the Fitness Center.

Table II shows the frequency distribution in percentage of respondents and mean responses of Fitness Center members and non-members concerning the importance of the Fitness Center to employees. The results in Table II indicate that the majority of employees returning the survey somewhat agree that a Fitness Center demonstrates an employer's commitment to the welfare of its employees, and helps workers stay on a regular fitness program.

TABLE I  
 FREQUENCY DISTRIBUTION IN PERCENTAGE OF RESPONDENTS AND MEAN RESPONSES OF FITNESS CENTER  
 MEMBERS AND NON-MEMBERS STATING MEASURES OF EMPLOYEES PERCEPTIONS OF THE FITNESS CENTER

	SD (1)	D (2)	SA (3)	A (4)	STA (5)	X	SD	T
1. The health & fitness programs are offered to all employees.	M 1.1 NM 7.4	2.7 8.3	8.6 14.5	30.4 42.3	57.1 27.4	4.4 3.7	.845 1.165	10.40**
2. The health & fitness programs are restricted to upper level mgmt.	M 60.9 NM 32.16	30.1 39.9	5.4 13.2	2.2 7.7	1.3 6.5	1.5 2.2	.806 1.154	10.16**
3. The health & fitness center is open at hours when I can participate.	M 1.7 NM 9.9	4.8 19.0	14.2 26.7	41.0 36.0	38.4 8.5	4.1 3.1	.929 1.126	14.83**
4. The health & fitness center is in a place where I have easy access.	M 2.0 NM 14.7	2.0 17.9	7.4 15.1	38.5 36.7	50.0 15.5	4.3 3.2	.8591 1.311	16.34**
5. The health & fitness programs offer a variety of activities that I am interested in.	M 0.3 NM 6.5	4.5 18.2	26.3 42.1	51.8 28.2	17.1 5.0	3.8 3.1	.781 .960	13.47**
6. The health & fitness center offers me the opportunity to interact with people outside my department.	M 1.3 NM 6.8	12.8 16.0	37.9 44.2	35.6 28.9	12.4 4.0	3.5 3.1	.911 .939	5.45**

\*P < .05, \*\*P < .01, SD = Strongly Disagree, D = Disagree, SA = Somewhat Agree, A = Agree, STA = Strongly Agree, M = Member, NM = Non-member

TABLE II

FREQUENCY DISTRIBUTION IN PERCENTAGE OF RESPONDENTS AND MEAN RESPONSES OF FITNESS CENTER MEMBERS AND NON-MEMBERS CONCERNING THE IMPORTANCE OF THE FITNESS CENTER TO EMPLOYEES

	SD (1)	D (2)	SA (3)	A (4)	STA (5)	X	SD	T
1. When considering whether to work for an organization, having an on-site fitness center would influence my decision in a positive way.	M 5.2	14.8	32.8	31.5	15.7	3.4	1.076	14.44**
	NM 22.4	36.3	25.7	10.9	4.7	2.4	1.091	
2. A health & fitness center is one type of benefit that shows me that my employer is committed to the welfare of its employees.	M 3.4	7.3	29.5	40.9	19.0	3.6	.978	9.74**
	NM 10.1	18.2	37.4	27.7	6.5	3.0	1.018	
3. Having an on-site health & fitness center would not affect my decision to work or stay with a particular organization.	M 3.5	20.5	27.9	34.5	13.4	3.3	1.039	8.41**
	NM 3.4	8.0	15.5	42.4	30.7	3.9	1.039	
4. Having an on-site health & fitness center would help me to stay on a regular fitness program.	M 2.2	9.2	19.6	34.0	35.0	3.9	1.052	15.48**
	NM 10.5	26.9	34.7	20.6	7.3	2.9	1.083	
5. I would be willing to pay to participate in my health & fitness program.	M 18.0	27.2	31.9	17.8	5.1	2.6	1.119	7.38**
	NM 35.8	30.4	21.5	9.1	3.2	2.1	1.101	

\*P < .05, \*\*P < .01, SD = Strongly Disagree, D = Disagree, SA = Somewhat Agree, A = Agree, STA = Strongly Agree, M = Member, NM = Non-member

Other measures of importance included how much of an influence a fitness center would have on someone's career decisions. Approximately 60% of all employees returning surveys somewhat agreed that having an onsite Fitness Center would positively influence their decision when considering whether to work for a particular organization. While over 60% agreed that having an onsite health and fitness center would not affect their decision to work for or stay with a particular organization. This may indicate that employees of Union Pacific Railroad are generally satisfied with their job and are not interested in changing their jobs to gain access to a Fitness Center. Since the program has been free from its opening, it is not surprising that over 55% of all employees disagreed with the statement "I would be willing to pay to participate in my health and fitness program."

The frequency distribution in percentage of respondents and mean responses between fitness center members and non-members concerning the relationship between regular exercise and perceptions of work productivity are shown in Table III. The majority of employees returning surveys believed that regular exercise would positively impact their work productivity. For example, more than 80% of all employees returning surveys somewhat agreed that regular exercise would help them be more productive at work. moreover, approximately 75% thought regular exercise would help them achieve a higher level of relaxation and

TABLE III

FREQUENCY DISTRIBUTION IN PERCENTAGE OF RESPONDENTS AND MEAN RESPONSES OF FITNESS CENTER MEMBERS AND NON-MEMBERS CONCERNING THE RELATIONSHIP BETWEEN REGULAR EXERCISE AND PERCEPTIONS OF WORK PRODUCTIVITY. REGULAR PHYSICAL EXERCISE WOULD HELP ME TO:

	SD	D	SA	A	STA	X	SD	T
	(1)	(2)	(3)	(4)	(5)	(5)		
1. Be more productive at work.	M 1.5	6.3	24.3	47.9	19.8	3.8	.890	10.84**
	NM 8.8	20.6	30.1	31.8	8.8	3.1	1.102	
2. Relax better at work.	M 1.5	8.4	23.9	46.2	19.8	3.7	.925	10.67**
	NM 8.6	24.2	26.9	32.2	8.1	3.1	1.109	
3. Think more clearly about work related problems.	M 1.7	12.5	26.2	42.8	15.6	3.6	.967	9.76**
	NM 10.0	28.1	25.7	27.9	8.4	3.0	1.138	
4. Concentrate better on work tasks.	M 1.3	12.3	28.0	40.7	17.4	3.6	.961	10.42**
	NM 9.3	28.5	28.9	25.6	7.7	2.9	1.106	
5. Enjoy my work better.	M 3.2	16.2	33.0	30.2	17.4	3.4	1.053	10.53**
	NM 13.4	33.9	26.4	20.3	5.9	2.7	1.111	
6. Relate better to my co-workers.	M 3.4	18.8	37.0	28.8	12.0	3.3	1.010	9.36**
	NM 11.0	36.7	30.5	17.3	4.5	2.7	1.028	
7. Has no effect on how I perform at work.	M 30.8	44.2	13.6	9.0	2.4	2.1	1.008	-11.23**
	NM 12.2	34.6	19.3	22.0	11.8	2.9	1.230	

\*P < .05, \*\*P < .01, SD = Strongly Disagree, D = Disagree, SA = Somewhat Agree, A = Agree, STA = Strongly Agree, M = Member, NM = Non-member



concentration at work; while over 60% disagreed with the statement that regular physical exercise would have no effect on work productivity.

The results from the self reported absenteeism questions are reported below. During the first nine months of operation, Fitness Center members who returned surveys were absent an average of 2.7 days per week while 2.5 days was the mean for non-members. However, this was not a significant difference. Over 75% of absences for all employees returning surveys did not last longer than one day. The survey sample reported that the mean number of days absent for members due to illness or injury was 2.4 days, while non-members were absent on the average of 2.2 days for illness or injury during the nine month study period. Over 44% of those returning surveys had one physical exam during the nine month period. Approximately 23% visited a doctor for an illness and 13% saw a doctor once for an injury. There was no significant difference between the groups.

A cross tabulation between membership status and the three categories of questions was computed. Three times as many non-members disagreed with the statement that the Fitness Center is offered to all employees. The number of members that believed the Fitness Center offered a variety of activity that interested them was double the number of

non-members. Moreover, twice as many members agreed with the statement that the Fitness Center was open during convenient hours.

It is not surprising that members perceived the importance of the Fitness Center much higher than non-members. Over three times as many members agreed with the statement "When considering whether to work for an organization, having an onsite health and fitness center would influence my decision in a positive way." Almost twice as many members believed that an onsite Fitness Center was a benefit demonstrating an employer's concern for the welfare of their employees. The most convincing cross tabulation was that 68% of all members and only 27% of non-members agreed with the statement that an onsite Fitness Center would help them stay with a regular fitness program.

Members were also more likely to report a relationship existed between regular exercise and work productivity. Almost two-thirds of all members agreed with the statements that regular exercise would help me to be more productive and relax better at work; whereas, 52% of all non-members somewhat agreed that regular exercise had no effect on work productivity.

### Regression Results

Table IVA displays the regression results outlining the effects of education, race, age, sex, tenure, occupation, marital status, income, membership and adherence on employee perceptions of the Fitness Center. The dependent variable for this analysis is perception of the Fitness Center which is the mean value of questions 3A-E on the questionnaire. Table IVB displays the regression results outlining the effects of education, race, age, sex, tenure, occupation, marital status, income, membership and exercise adherence on employee perceived importance of the Fitness Center. The dependent variable for this analysis is perceived importance of the Fitness Center which is the mean value of questions 4A-E on the questionnaire. Table IVC displays the regression results outlining the effects of education, race, age, sex, tenure, occupation, marital status, income, membership and exercise adherence on the relationship between exercise and work productivity. The dependent variable for this analysis is the relationship between exercise and work productivity which is the mean value of questions IIA-G on the questionnaire.

The findings reported in Table IV give us additional information but are not surprising when considering the other findings of this study. Also, there are some similarities with the studies by Rudman (1987) and Rudman and Steinhardt (1988).

TABLE IV A

REGRESSION RESULTS OUTLINING THE EFFECTS OF EDUCATION, RACE, AGE, SEX, TENURE, OCCUPATION, MARITAL STATUS, INCOME AND PARTICIPATION/ADHERENCE ON EMPLOYEE PERCEPTIONS OF THE FITNESS CENTER. DEPENDENT VARIABLE: PERCEPTION OF THE FITNESS CENTER.

Independent Variables	Beta	T	Level of Significance	Entered on Step
Education	.010	.278	- .278	
Race	.014	.491	- .62	
Age	.104	3.469	2.01	3
Sex	.234	2.842	< .01	5
Tenure	.058	1.053	.29	
Occupation	-.097	-3.214	< .01	4
Marital Status	-.005	-.185	.85	
Income	-.019	-.119	.54	
Membership	-.430	13.356	< .01	1
Adherence	.134	4.267	< .01	2

TABLE IV B

REGRESSION RESULTS OUTLINING THE EFFECTS OF EDUCATION, RACE, AGE, SEX, TENURE, OCCUPATION, MARITAL STATUS, INCOME AND PARTICIPATION/ADHERENCE ON THE PERCEIVED IMPORTANCE OF THE FITNESS CENTER. DEPENDENT VARIABLE: PERCEIVED IMPORTANCE OF THE FITNESS CENTER.

<u>Independent Variables</u>	<u>Beta</u>	<u>T</u>	<u>Level of Significance</u>	<u>Entered on Step</u>
<u>Education</u>	<u>-.043</u>	<u>-1.254</u>	<u>.21</u>	
<u>Race</u>	<u>-.030</u>	<u>.816</u>	<u>.30</u>	
<u>Age</u>	<u>.032</u>	<u>.733</u>	<u>.46</u>	
<u>Sex</u>	<u>-.034</u>	<u>-1.121</u>	<u>.26</u>	
<u>Tenure</u>	<u>-.086</u>	<u>-2.885</u>	<u>&lt; .01</u>	<u>3</u>
<u>Occupation</u>	<u>-.021</u>	<u>-.707</u>	<u>.48</u>	
<u>Marital Status</u>	<u>-.037</u>	<u>-1.252</u>	<u>.21</u>	
<u>Income</u>	<u>.043</u>	<u>1.457</u>	<u>.15</u>	
<u>Membership</u>	<u>.316</u>	<u>9.778</u>	<u>&lt; .01</u>	<u>1</u>
<u>Adherence</u>	<u>.224</u>	<u>7.028</u>	<u>&lt; .01</u>	<u>2</u>

TABLE IV C

REGRESSION RESULTS OUTLINING THE EFFECTS OF EDUCATION, RACE, AGE, SEX, TENURE, OCCUPATION, MARITAL STATUS, INCOME AND PARTICIPATION/ADHERENCE ON THE RELATIONSHIP BETWEEN EXERCISE AND WORK PRODUCTIVITY. DEPENDENT VARIABLE: RELATIONSHIP BETWEEN EXERCISE AND WORK PRODUCTIVITY.

Independent Variables	Beta	T	Level of Significance	Entered on Step
Education	.024	.607	.50	
Race	-.030	-.995	.32	
Age	.071	1.621	.11	
Sex	-.082	-2.676	< .01	4
Tenure	-.163	5.192	< .01	3
Occupation	-.042	-1.316	.20	
Marital Status	-.006	-.197	.84	
Income	-.008	-.248	.80	
Membership	.172	5.163	< .01	2
Adherence	.252	7.717	< .01	1

The effects of both membership and exercise adherence consistently influenced predictions on the three dependent variables. Members and active exercisers had a significantly more positive perception of the Fitness Center and considered it to be of greater importance. They were also more likely to report that regular exercise had a direct impact on their work productivity.

Gender, age, occupation and tenure predicted responses regarding perceptions of the Fitness Center and the relationship between regular exercise and work productivity. Females and younger employees were more likely to have a favorable perception of the Fitness Center. Employees in the higher level job categories (i.e. officials, managers and professionals) tended to have a more positive perception of the Fitness Center than those in the lower level job categories (i.e. clerical, skilled and unskilled laborers). The perceived importance of the Fitness Center was lower among those with more than twenty years of service and these same employees also tended to disagree that regular exercise influenced their work productivity. Finally, females were more likely to report that exercise had a positive impact on perceptions of work productivity.

## CHAPTER SIX

### Discussion

#### Introduction

Only a small amount of research has been conducted looking at the relationship between onsite fitness facilities and work productivity. However, the research that has been reported provides limited support that work productivity can be improved by having an onsite Fitness Center. For example, Rudman and Steinhardt (1988) noted that a substantial majority of both members and non-members directly linked exercise behavior to work productivity.

Other studies also reported improvements in work performance due to exercise. Reports of being able to work harder both mentally and physically after participation in an onsite fitness program was reported by Durbeck, et al. (1972). Cox, Shephard and Corey (1981) reported improved productivity related to regular exercise and concluded that health promotion programs have potential economic benefits. Moreover, the results from a study by Bernacki and Baun (1984) suggested there was a significant relationship between average job performance and exercise adherence; while a negative relationship existed between poor job performance and exercise adherence among white collar workers participating in a corporate fitness program.



The above studies are not readily accepted by all researchers. Falkenberg (1987) noted that much of the research that has examined the relationship between exercise and work performance has been poorly designed, and without consistent definitions and dependent variables. Falkenberg (1987) also noted that the majority of this research used subjective rather than objective measures to determine productivity. However, as pointed out by Price (1986) it is virtually impossible to quantify productivity levels. Also the positive results reported by Bernacki and Baun (1984); Cox, Shephard and Corey (1981); Durbeck et al. (1972); Rudman (1987); and Rudman and Steinhardt (1988) should be acknowledged as providing some type of limited support for the positive relationship between participation/adherence in an onsite fitness program and work productivity.

#### Survey Analysis

The survey results indicate that all responding employees perceived the implementation of an onsite Fitness Center in a positive way even though 48% of the responses came from non-members. However, the Fitness Center is viewed negatively by many union workers. This is reflected in the low return rate from this population. Therefore, the returned surveys may be a reflection of selection bias. Before the Fitness Center opened, it was met with much criticism and seen as the reason why other employees lost

their jobs. Therefore, the positive results concerning the Fitness Center after it has been open for only nine months are encouraging.

Only part of the survey used by Rudman (1987) was mailed at the company's request. At the time of the study, company authorities did not want to measure job and company satisfaction; however they were interested in knowing what employees thought of the Fitness Center.

There was a significant difference between members and non-members on the perception and perceived importance of the Fitness Center. This showed that members are generally satisfied with the Fitness Center at least during the first nine months of operation. The Fitness Center was perceived as important but this percentage was relatively low when compared to the other questions. People who have worked at Union Pacific for a long time did not have a Fitness Center and for the most part enjoy working for the company. A Fitness Center would have to be in place for a relatively long period of time to get more accurate information on how it affects worker's decision to work for or stay with a particular company. The other questions in the perceived importance section which dealt with the Fitness Center's ability to effect career decisions, relay a positive message from the employer and help workers stay on a regular fitness program all received favorable ratings.

A majority of the responding employees at Union Pacific were not willing to pay to participate in an onsite health and fitness program. This conflicted with the results of the study conducted at Campbell Soup Company Headquarters by Rudman (1987). Union Pacific employees may not be willing to pay because the program was free since its opening; whereas, Campbell Soup employees paid a joiners' fee and annual dues for at least the first three years to participate in their health and fitness center.

Regardless of membership status more than 70% of respondents somewhat agreed that regular exercise would help them be more productive and relaxed at work. Also, the majority agreed there was some type of relationship between regular exercise and work productivity. This finding is important; it shows that all people are becoming increasingly aware of the psychological benefits of exercise regardless of activity levels.

The majority of all respondents were not absent from work a substantial number of days. Although this was self-reported absenteeism, it is considered to be quite accurate. Departments at U.P. keep their own absenteeism records and some missed days are not reported for various reasons (i.e. favors, miscalculated, unreported, etc.). Moreover, Farh et al. (1988) noted that self appraisal

evaluation is a successful alternative to supervisor evaluation when the results will be used for research purposes.

None of the absenteeism data was significant between members and non-members. The effect of health promotion programs on absenteeism are not documented for having immediate impact. Rather, Gibbs et al. (1985) noted that members are absent more often at the beginning of an onsite health promotion program and then later non-members start to have higher absenteeism rates. Twenty-three percent of the respondents visited a doctor for an illness during the study period. This figure appears to be below the national average reported by the U.S. Department of Health and Human Services (McLemore & Dolzier, 1987). In 1985 the U.S. Government reported the average number of office visits per person per year was 2.7. Forty-four percent of the survey sample received a physical exam during the study period. Fitness Center members most likely accounted for the majority of the 44% since joining the U.P. Fitness Center requires obtaining a doctor's signature on a medical release form. This figure is well above the national average of 4.8% (McLemore & Dolzier, 1987). As mentioned earlier this is because of the mandatory medical release required of all Fitness Center members.

The cross tabulation results were not surprising. They confirmed that active exercising members responding to the survey were more positive than non exercising non-members on all three categories of questions. A general conclusion is that members are satisfied with the Fitness Center after the first nine months of operation. This enthusiasm among members has helped boost Union Pacific membership. After nine months of operation, employees are still consistently joining the Fitness Center.

The majority of all employees responding to the survey had a positive impression of the Fitness Center. However, members were more likely to agree that the Fitness Center offered a variety of activities, was open during convenient hours and allowed them easy access; whereas, non-members were not as positive in their responses. The perceived importance of the Fitness Center was also higher among members, and significant differences between members and non-members existed on whether regular exercise had an impact on perceptions of work productivity. The majority of non-members thought regular exercise had no relationship with work productivity whereas the reverse was true among members.

The results from the cross tabulation were expected. In fact, at the beginning of the study the researchers predicted the non-members to be more negative than the actual results show. This may imply that more people are

beginning to realize the importance of onsite fitness programs but are not yet ready to endorse them by becoming actively involved.

The regression results revealed some interesting findings. Participation and adherence were the most influential variables used to make predictions on the three categories of questions. This agreed with the study by Rudman (1987). Members and active exercisers were most likely to have a positive impression of the Fitness Center, perceive it as important and thought there was a positive relationship between regular exercise and work productivity.

Other factors influencing perceptions of the Fitness Center and the relationship between regular exercise and work productivity were: gender, age, occupation, and tenure. Responses from females were more positive in all three categories of questions. Rudman (1987) reported a similar finding. Employees in the higher level occupations also had a more positive impression of the Fitness Center. This result may be attributed to the higher education levels typically found among these employees. Tenure had an impact on responses regarding the perceived importance of the Fitness Center and the relationship between regular exercise and perceptions of work productivity. Employees with more than twenty years of service generally disagreed

with the questions in these two categories. This may be due to being committed to the old habits of the railroad or workplace which typically did not offer any type of onsite health promotion program. Also, the changes in the educational systems regarding lifetime fitness were not prevalent during the time the majority of these employees attended school.

#### Future Research

There are a limited number of studies concerning the relationship between regular exercise and work productivity. Therefore more research is needed in this area because the reports from these studies provide us with no conclusive evidence. It is recommended that more research be conducted at a number of onsite Fitness Centers at various stages of development. Also, this study and those by Rudman (1987) and Rudman and Steinhardt (1988) dealt only with workers' perceptions of productivity. More research looking at the relationship between supervisor performance appraisals and workers' perceptions of productivity should also be conducted. Finally, longitudinal studies at the same location would provide additional insight into the long-term effects of the various independent variables (i.e. age, sex, race, etc. outlined in Table IV) on the perceptions of onsite fitness facilities.

### Conclusion

This study focused on the effects of an onsite Fitness Center on perceptions of worker productivity after the first nine months of operation. Perceptions of the Fitness Center and the relationship between regular exercise and work productivity was measured to see if a significant difference existed between members and non-members. The results suggested a strong positive relationship exists between membership status, exercise adherence and perceptions of the Fitness Center, as well as a positive relationship between regular exercise and perceptions of work productivity. These results are similar to the studies conducted by Rudman (1987) and Rudman and Steinhardt (1988). The effects of participation/ adherence, gender, occupation, income and tenure conditioned the results. The results from this study suggest that membership and exercise adherence in an onsite fitness program impact perceptions of work productivity. However, similar studies at other onsite facilities during different stages of development are needed.



## APPENDIX

Dear Fellow Employees:

Attached you will find a questionnaire that is being sent to all Union Pacific Railroad employees in the Omaha/Council Bluffs area.

This study is sponsored by the University of Nebraska-Omaha and will be used to fulfill thesis requirements for a Master of Science degree. Results from this study may be used by other professionals associated with corporate health promotion. We are asking all employees to complete the questionnaire which will take approximately 5-10 minutes.

Participation in this study is entirely voluntary and your name will not be associated with the questionnaire. To insure confidentiality only group results will be used when reporting the findings. No individual results will be tabulated or reported.

If you need information in filling out the questionnaire, please do not hesitate to call 271-5814 or 554-2670 and leave a message. I will return your call as soon as possible. Please complete the entire survey before dropping it in the company mail addressed to the Union Pacific Fitness Center.

**Please return all surveys by June 28th.**

Daniel Blanke, Ph.D.  
Associate Professor  
Department of Health, Physical  
Education, Recreation and Dance  
University of Nebraska at Omaha

Joseph Leutzinger  
Graduate Assistant  
Department of Health, Physical  
Education, Recreation and Dance  
University of Nebraska at Omaha

## Fitness Center Survey

I. The following questions deal primarily with leisure time activities.

1. Do you belong to a racket club or fitness club not associated with your work? YES\_\_\_ NO\_\_\_
2. Do you know about the health and fitness program at your work place? YES\_\_\_ NO\_\_\_

Are you currently a member of the Union Pacific Fitness Center? YES\_\_\_ NO\_\_\_

If yes, how long have you been a member?

(Please circle how many months)

9 8 7 6 5 4 3 2 1 \_\_\_ less than one month

Please indicate your activity level whether you exercise at the U.P. Fitness Center or outside of it.

\_\_\_\_\_ Nonexerciser. An employee who signed up, received a physical and attended an orientation, became a member of the Union Pacific Fitness Center, but never participated.

\_\_\_\_\_ Exerciser. An employee who exercises an average of less than once per week.

\_\_\_\_\_ Frequent Exerciser. An employee who exercises an average of once or twice per week.

\_\_\_\_\_ Active Exerciser. An employee who exercises an average of more than twice per week.

3. What are your impressions of the health and fitness program where you work? Please indicate how strongly you agree or disagree with the following statements by circling the appropriate number.

	SD	D	SA	A	SA
A. The health and fitness programs are offered to all employees.	1	2	3	4	5
B. The health and fitness programs are restricted to upper-level management.	1	2	3	4	5
C. The health and fitness center is open at hours when I can participate.	1	2	3	4	5
D. The health and fitness center is in a place where I have easy access.	1	2	3	4	5
E. The health and fitness programs offer a variety of activities that I am interested in.	1	2	3	4	5

F. The health and fitness center offers me the opportunity to interact with people outside my department. 1 2 3 4 5

4. The following questions ask whether you believe that onsite fitness program add to the quality of the work place atmosphere. Please indicate how strongly you agree or disagree with the following statements by circling the appropriate number.

- |  | SD | D | SA | A | SA |
|--|----|---|----|---|----|
| A. When considering whether to work for an organization, having an onsite health and fitness center would influence my decision in a positive way. | 1  | 2 | 3  | 4 | 5  |
| B. A health and fitness center is one type of benefit that shows me that my employer is committed to the welfare of its employees.                 | 1  | 2 | 3  | 4 | 5  |
| C. Having an onsite health and fitness center would not affect my decision to work for or stay with a particular organization.                     | 1  | 2 | 3  | 4 | 5  |
| D. Having an onsite health and fitness center would help me to stay on a regular fitness program.  | 1  | 2 | 3  | 4 | 5  |
| E. I would be willing to pay to participate in my health and fitness program.  | 1  | 2 | 3  | 4 | 5  |

II. Regular physical exercise would help me to:

- |  | SD | D | SA | A | SA |
|--|----|---|----|---|----|
| A. Be more productive at work.                     | 1  | 2 | 3  | 4 | 5  |
| B. Relax better at work.                           | 1  | 2 | 3  | 4 | 5  |
| C. Think more clearly about work-related problems. | 1  | 2 | 3  | 4 | 5  |
| D. Concentrate better on work tasks.               | 1  | 2 | 3  | 4 | 5  |
| E. Enjoy my work better.                           | 1  | 2 | 3  | 4 | 5  |
| F. Relate better to my co-workers.                 | 1  | 2 | 3  | 4 | 5  |
| G. Has no effect on how I perform at work.         | 1  | 2 | 3  | 4 | 5  |

III. The following questions ask you to remember the times you were absent from your job at regularly scheduled work times during the previous 9 months. Absent means that you did not come to work when expected. Do not include holidays or vacation days.

1. During the prior 9 months,      0 1 2 3 4 5 6 7 8 9 10+  
how many days were you absent  
from regularly scheduled work?
2. Of the times you were absent, 0 1 2 3 4 5+  
how many of these absences  
lasted for more than a single day?
3. Of the above, how many were      0 1 2 3 4 5+  
you absent for illness or injury?
4. During the prior 9 months, how many times did you seek  
medical attention for the following (doctor, emergency  
room, company medical department).
  - A. Checkup or Physical            1 2 3 4 5+
  - B. Illness                            1 2 3 4 5+
  - C. Injury                             1 2 3 4 5+

IV. Now I'd like to ask you a few questions on your background to help us with our analysis.

1. What is the last grade of school you completed?
 

8th grade or less	[    ]
Some high school	[    ]
High school graduate	[    ]
Some college	[    ]
College graduate	[    ]
Post graduate	[    ]
Don't know/No answer	[    ]
2. What is your race?
 

White	[    ]
Black	[    ]
Hispanic	[    ]
Oriental	[    ]
Native American	[    ]
Other	[    ]
List _____	[    ]
Don't know/No answer	[    ]
3. How old are you? \_\_\_\_\_
4. Please check one of the following:  
Sex: Male [    ] Female [    ]
5. How long have you worked for your  
employer? \_\_\_\_\_ years.
6. Are you currently (please check only one category).
  - a. employed full time [    ]
  - b. employed part time [    ]
  - c. other

(explain) \_\_\_\_\_.

7. Check the one that best describes your present job.
- official or manager  
 professional  
 technician  
 sales  
 clerical  
 skilled crafter worker  
 semi-skilled operator  
 unskilled laborer or service worker
8. Are you presently:
- married  [ ]  
widowed  [ ]  
separated  [ ]  
divorced  [ ]  
single  [ ]
9. What was your total household income category before taxes for the past year, 1987. Was it: (Please check one):
- Less than \$14,999  [ ]  
\$15,000 to 24,999  [ ]  
\$25,000 to 34,999  [ ]  
\$35,000 to 49,999  [ ]  
\$50,000 to 64,999  [ ]  
Over 65,000  [ ]

**Please use the enclosed envelope addressed to the Fitness Center and drop the completed questionnaire in the company mail by June 28th.**

## WORKS CITED

- Anderson, C. D., Warner, J. L., & Spencer, C. C. (1984). Inflation Bias in Self Assessment Examinations. Implications for Valid Employee Selection. Journal of Applied Psychology, 69, 574-580.
- Anderson, D. R., & Jose, W. S. (1987). Employee Life-style and the Bottom Line. Results from the Staywell Evaluation. Fitness in Business, pp. 86-92.
- Baun, W. B., Bernacki, E. J., & Tsai, S. P. A. (1986). Preliminary Investigation: Effect of a Corporate Fitness Program on Absenteeism and Health Care Costs. Journal of Occupational Medicine, 28, 18-22.
- Bernacki, E. J., & Baun, W. B. (1984). The Relationship of Job Performance to Exercise Adherence in a Corporate Fitness Program. Journal of Occupational Medicine, 26, 529-531.
- Bjurnstrom, L., & Alexiou, N. (1978). A Program of Heart Disease Intervention for Public Employees. Journal of Occupational Medicine, 20, 521-531.
- Bly, J. L., Jones, R. C., & Richardson, J. E. (1986). Impact of Work-Site Health Promotion on Health Care Costs and Utilization. Journal of the American Medical Association, 256, 3235-3240.
- Bowne, D., Russell, M., Morgan, J., Optenburg, S., & Clarke, A. (1984). Reduced Disability and Health Care Costs in an Industrial Fitness Program. Journal of Occupational Medicine, 26, 809-816.
- Butler, K. N. (1969). The Effect of Physical Conditioning and Exertion of the Performance of a Simple Mental Task. Journal of Sports Medicine and Physical Fitness, 9, 266-270.
- Chenoweth, D. (1983, June). Fitness Program Evaluation. Results with Muscle. Occupational Health and Safety, pp. 14-17, 40-42.
- Cooper, K. H., Pollack, M. L., Martin, R. P., White, S. R., Linnerud, C. A., & Jackson, A. (1976). Physical Fitness Levels vs. Selected Coronary Risk Factors: A Cross-sectional Study. Journal of the American Medical Association, 236, 166-169.

- Cox, M., Shephard, R. J., & Corey, P. (1981). Influence of an Employee Fitness Programme Upon Fitness, Productivity, and Absenteeism. Ergonomics, 24, 795-806.
- Driver, R. W. & Ratliff, R. A. (1982). Employers' Perceptions of Benefits Accrued from Physical Fitness Programs. Personnel Administrator, 27, 21-26.
- Durbeck, D. C., Heinzelman, F., Schacter, J., Haskell, W. L., Payne, G. H., Moxley, R. T., Nemiroff, J., Limoncellis, D. D., Arnoldi, L. B., & Fox, S. M. (1972). The National Aeronautics and Space Administration - U.S. Public Health Service Evaluation and Enhancement Program. The American Journal of Cardiology, 30, 784-790.
- Falkenberg, L. E. (1987). Employee Fitness Programs: Their Impact on the Employee and the Organization. Academy of Management Review, 12, 511-522.
- Farh, J. L. & Webel, J. D. (1986). The Effects of Purpose of the Appraisal and Expectation of Validation on Self-Appraisals Leniency. Journal of Applied Psychology, 71, 527-529.
- Farh, J. L., Webel, J. D., & Bedeian, A. G. (1988). An Empirical Investigation of Self-Appraisal-Based Performance Evaluation. Personnel Psychology, 41, 141-144.
- Folkins, C. H., Lynch, S., & Gardner, M. M. (1972, November). Psychological Fitness as a Function of Physical Fitness. Archives of Physical Medicine and Rehabilitation, pp. 503-508.
- Gibbs, J. B., Mulvaney, M. L., Henes, S. & Reed, B. L. (1985, November). Worksite Health Promotion: Five Year Trend in Employee Healthcare Costs. Journal of Occupational Medicine, pp. 826-830.
- Golden, C. J. (1978). The Stroop Color and Word Test: A Manual for Clinical and Experimental Uses. Chicago: Stoelting.
- Gutin, B. (1965). Effect of Increase in Physical Fitness on Mental Ability Following Physical and Mental Stress. Research Quarterly, 37, 211-220.
- Hammerton, M., & Tickner, A. M. (1969). Physical Fitness and Skilled Work After Exercise. Ergonomics, 11, 41-45.

- Heinzelman, F., Bagley, R. W. (1970). Response to Physical Activity Programs and Their Effects on Health Behavior. Public Health Records, 85, 905-911.
- Horowitz, S. M. (1987). Effects of a Worksite Wellness Program on Absenteeism and Health Care Costs in a Small Federal Agency. Fitness in Business, 1(5), 167-172.
- Howard, J., & Mikalachki, A. (1979). Fitness and Employee Productivity. Canadian Journal of Applied Sports Sciences, 4(3), 191-198.
- Hughes, J. R. (1984). Psychological Effects of Habitual Aerobic Exercise: A Critical Review. Preventive Medicine, 13, 66-78.
- Lichtman, S., & Poser, E. G. (1983). The Effects of Exercise on Mood and Cognitive Functioning. Journal of Psychosomatic Research, 27, 43-52.
- McLemore, T., & Dolzier, J. (1987). 1985 Summary: National Ambulatory Medical Care Survey. From the Vital and Health Statistics of the National Center for Health Statistics, U.S. Department of Health and Human Services, No. 128, 23 January, 1-8.
- O'Donnell, M. P., & Ainsworth, T. H. (1984). Health Promotion in the Work Place. New York: John Wiley and Sons.
- Pollack, M. L., Broida, J., Kendrick, Z., Miller, H. S., Janeway, R. & Linnerud, A. C. (1972). Effects of Training Two Days/Week at Different Intensities on Middle Aged Men. Medicine and Science in Sports and Exercise, 4, 192-194.
- Price, J. L. (1986). Handbook of Organizational Measurement. Mansfield, MA: Pitman Publishing Inc.



- Raven, J. C. (1960). Guide to the Standard Progressive Matrices, Sets A, B, C, D, and E. London, England: H. K. Lewis and Company.
- Rhodes, E. C., & Dunwoody, D. (1980). Physiological and Attitudinal Changes in Those Involved in an Employee Fitness Program. Canadian Journal of Public Health, 71, 331-336.
- Rudman, W. J. (1987, August). Do Onsite Health and Fitness Programs Affect Worker Productivity? Fitness in Business, 2-6.
- Rudman, W. J., & Steinhardt, M. (1988). Fitness in the Workplace: The Effects of a Corporate Health and Fitness Program on Work Culture. Health Values, 12(2), 4-17.
- Siegel, W., Blomquist, G., & Mitchell, J. H. (1970, January). Effects of a Quantitated Physical Training Program on Middle-Aged Sedentary Men. Circulation, 51, 19-29.
- Steers, R. M. & Porter, L. W. (1987). Motivation and Work Behavior (4th Ed). New York: McGraw Hill Publishing Inc.
- Weingarten, G. (1973). Mental Performance During Physical Exertion, the Benefit of Being Physically Fit. International Journal of Sport Psychology, 4, 16-18.
- Yarvote, P. M., McDonagh, T. J., Goldman, M. E., & Zuckerman, J. (1974). Organization and Evaluation of a Physical Fitness Program in Industry. Journal of Occupational Medicine, 16, 589-598.
- Young, J. R., & Ismail, A. H. (1977). Comparison of Selected Physiological and Personality Variables in Regular and Nonregular Adult Male Exercisers. Research Quarterly, 47, 617-622.
- Youngblood, S. A. (1984). Work, Nonwork and Withdraw. Journal of Applied Psychology, 69, 106-117.