Order Number 9026932

Relationship among certain physiological variables and teaching effectiveness of male college faculty

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Middle Tennessee State University, 1990

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RELATIONSHIP AMONG CERTAIN PHYSIOLOGICAL VARIABLES AND TEACHING EFFECTIVENESS OF MALE COLLEGE FACULTY

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A dissertation presented to the
Graduate Faculty of Middle Tennessee State University
in partial fulfillment of the requirements
for the degree Doctor of Arts

May, 1990

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ABSTRACT

RELATIONSHIP AMONG CERTAIN PHYSIOLOGICAL VARIABLES AND TEACHING EFFECTIVENESS OF MALE COLLEGE FACULTY

by

Jerry Lynn Griffith

The purpose of this study was to determine the relationship among certain physiological variables and teacher effectiveness of male college faculty members.

Twenty-five male faculty members at David Lipscomb University were measured for the following physiological variables: age, height, resting heart rate, systolic blood pressure, diastolic blood pressure, muscular endurance, percent body fat, and oxygen consumption. Each variable was correlated with each faculty member's student evaluation score.

Significant relationships were found to exist between the following physiological variables and student evaluation scores: height, diastolic blood pressure, and relative oxygen consumption.

A stepwise regression was computed to determine which physiological variables best predict teacher effectiveness. It was concluded that diastolic blood pressure, percent body fat, and relative oxygen consumption relate to teacher effectiveness.

ACKNOWLEDGEMENTS

Completion of a project of this magnitude while maintaining a full-time job as demanding as college teaching and coaching, could not occur without the help and encouragement of many people.

I wish to express thanks to my loving wife, Dianne. She has always been supportive of this endeavor. Also, I want to thank my two sons, Matthew and Coleman. They have shown patience and waited for the day they could call their father "Dr. Daddy."

Also, I wish to express a debt of gratitude to Dr. Earl Dennis, former Academic Dean at David Lipscomb University. It was Dr. Dennis who encouraged me to return to school and pursue a terminal degree. Without his concern this task might possibly have never been undertaken.

Also, without the valuable statistical expertise of Dr. Richard Kulp and Mike Carmody of David Lipscomb University, this project could not have been completed.

Lastly, I know I owe a debt I can never repay to the graduate faculty of Middle Tennessee State University. Many great people have shared wisdom and expertise with me from this fine institution. Especially would I like to thank Dr. Powell McClellan, major professor, who has been a constant help throughout this project.

Upon completion of this project, I can truly say I understand what the Apostle Paul meant when he said, "I can do all things through Christ, who strengtheneth me."

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CHAPTER 1

Introduction

Modern technology has practically eliminated the need for activity. Movement and activity are basic functions needed by humans for health development and maintenance. Research indicates that negative lifestyle and physical inactivity cause serious health problems. The leading causes of death in the 1980's, cancer and cardiovascular diseases, tend to be associated with lifestyle.

Research in the last decade documents that wellness programs for employees tend to reduce health care insurance costs. However, not all employees or employers choose to promote wellness at the worksite. The following statistics illustrate the cost of the non-fit employee: the American Heart Association estimates that employers spend $700 million each year to replace heart attack victims. Lower back pain affects 75 million Americans yearly and has been estimated to cost $1 billion in lost productivity (Howell, 1985). Besides these statistics, the non-exercising employee has increased the cost of health care to the employee and employer. The cost of health care has risen steadily in the last few years. In 1982, Americans spent over $300 billion on health care ("Workplace Health," 1984). Of the $300 billion spent, it is estimated that 97% went toward curing disease while

only three percent was spent on disease prevention (Kuntzleman, 1982). The average cost of health insurance per employee in 1987 was $1,985. This was a $128 increase over 1986 (Caprino, 1988). The cost of rising insurance rates are further illustrated by the 1988 statistics. In 1988, $541 billion was spent on health care. This was an average cost of $2,135 per person (Thompson, 1989). These figures illustrate the huge sums of money being spent on health care.

Although considerable research has been conducted related to the effectiveness of wellness programs in industry, little has been conducted in the field of education.

The purpose of this study was to examine the relationship between teaching effectiveness of male college faculty and each faculty member's fitness level.

Delimitations of the Study

The subjects of this study were 25 full-time male faculty members at David Lipscomb University. The determination of full-time status was based on the full-time equivalency formula used by the Vice President of Academic Affairs.

Teacher effectiveness was measured using the student evaluation of the faculty. Data from the student evaluation of the faculty administered in the spring semester of 1989 was used to determine teacher effectiveness.

Fitness levels were determined by performing physical assessment tests on participating faculty members.

Implications for Teaching

Society demands accountability in education. Taxpayers deserve to have mentally competent and physically healthy people teach in public education. Students attending private institutions and parents paying the tuition costs deserve the same accountability. Since accountability has become an issue in higher education, much attention has been focused on improving the methodology of the classroom teacher.

Definitions of Terms

Absolute Oxygen Consumption

A measure of the efficiency of the cardiovascular system providing oxygen to the body cells during exercise. This measurement is expressed in liters per minute.

Bicycle Ergometer

A calibrated, stationary bicycle used for submaximal exercise testing.

Blood Pressure

A measure of the force exerted against the walls of the blood vessels by the blood flowing through the vascular system.

Body Composition

The ratio of fat weight to total body weight in the human body.

Cardiovascular Endurance

The ability of the lungs, heart, and blood vessels to deliver adequate amounts of oxygen to the cells to meet the demands of prolonged activity.

Diastolic Blood Pressure

Force exerted on the vascular walls during the relaxation of the heart. This is the last number recorded in a reading. This is the last sound heard when measuring with a sphygmanometer.

Fitness Assessment

A battery of tests performed on a subject to measure their present state of physical conditioning.

Flexibility

The range of motion at a joint, or series of joints.

Fox Equation

A formula used to predict maximal oxygen consumption from a submaximal heart rate.

Heart Rate Monitor

A piece of electronic equipment using a sensor that displays a person's heart rate.

Muscular Endurance

The ability of a skeletal muscle group to sustain exercise for an extended period of time.

Relative Oxygen Consumption

Absolute oxygen consumption expressed as milliliters per kilogram of body weight.

Sphygmomanometer

An instrument used to measure blood pressure.

Systolic Blood Pressure

Force exerted against the vascular walls during contraction of the heart. This is the top number in a reading. This is

the first sound heard when measuring blood pressure with a sphygmomanometer.

Teacher Effectiveness

A term indigenous to this study, which refers to scores obtained from student evaluation of the university faculty.

Wellness

A state of well-being, the absence of disease. Wellness consists of physical fitness, environmental sensitivity, stress awareness and management, nutritional awareness, adequate rest, and self responsibility (Rosato, 1986).

Hypotheses

The following null hypotheses were tested:

1. There will be no relationship between the student evaluation score and the age of the faculty member.

2. There will be no relationship between the student evaluation score and the height of the faculty member.

3. There will be no relationship between the student evaluation score and the resting heart rate of the faculty member.

4. There will be no relationship between the student evaluation score and the resting systolic blood pressure of the faculty member.

5. There will be no relationship between the student evaluation score and the resting diastolic blood pressure of the faculty member.

6. There will be no relationship between the student evaluation score and the flexibility of the faculty member.

7. There will be no relationship between the student evaluation score and the percent of body fat of the faculty member.

8. There will be no relationship between the student evaluation score and the muscular endurance of the faculty member.

9. There will be no relationship between the student evaluation score and the absolute oxygen consumption of the faculty member.

10. There will be no relationship between the student evaluation score and the relative oxygen consumption of the faculty member.

CHAPTER 2

Review of Related Literature

The review of literature will consist of two parts, Wellness in Industry and Wellness in Education.

Wellness Programs in the Workplace

The Need for Wellness Programs

Statistics tend to support the fact that more people are exercising in the United States than ever. There is a definite need for exercise because of the nation's lifestyle (deVires, 1986). While previous generations engaged in strenuous activity which was job associated because of the agrian and industrial economy, today's economy is an information based economy which does not require strenuous physical work at the job site (Naisbitt, 1982).

While more people are exercising than ever before, this does not mean the entire population is health conscious. Statistics document our unhealthy habits and their effects on illnesses that plague society and the effect of the illnesses on the economy. A large percentage of illnesses in the United States are lifestyle related. Cardiovascular diseases and cancer combined afflict more people in the United States than any other categories of illnesses. Research links causes of cardiovascular disease and cancer as lifestyle related (Kaman, 1987). Lifestyle illnesses affected the

cost of health care in the United States. Since 1970, health care costs have risen from 6.6% to 11.5% of the Gross National Product (Thompson, 1989). Also, if health care costs continue to esculate at the current rate, it is estimated that health care costs will reach $1 trillion by 1993, with American businesses paying 35-40% of that total (Kaman, 1987). Not only have lifestyle diseases affected the cost of health care, but the cost of consumer products are affected also. In 1980, Chrysler estimated that the cost of employee health care claims added $220 to the price of a new car. In 1982, General Motors reported spending more money on health care claims than the steel purchased to build their cars (Kaman, 1987).

Because of the sedentary society and escalating health care costs, American businesses are stressing the need for exercise to their employees with wellness programs at the worksite. Examples of large corporations offering wellness programs for their employees are Black and Decker, Chrysler, General Electric, Honeywell, IBM, Johnson and Johnson, Kimberly - Clark, Kraft, Motorola, Shaklee, and Tenneco (Leepson, 1988). Besides the companies listed above, Fortune 500 companies such as Exxon, Firestone, Mobil Oil, North American Rockwell, Western Electric, Phillips Petroleum, General Foods, and the AMF Corporation have begun offering wellness programs for their employees (Howell, 1985). The wellness movement has not limited itself to large businesses; two-thirds of all companies with more than 50 employees

offer some form of wellness program (Leepson, 1988). Wellness programs vary in the business sector. Programs vary from health related newsletters for employees, recreational sports programs, to in-depth exercise prescription based on medical history, risk appraisal, and fitness assessments (Griffin and Ziegler, 1986). Companies that start programs are advised to research the situation before actually implementing a program. It is advised that companies follow these steps:

1. Define the objectives of the program.

2. Identify your needs. This can be accomplished by performing health risk appraisals and attitude surveys on employees.

3. Compute the results and address the health needs of the clientelle.

4. Promote the program. This can be done by the company administration demonstrating a commitment to the program. This can be done by the company installing equipment and providing facilities that make it easier for employees to exercise.

5. Monitor the progress. This step assesses the effectiveness of the program (Rothman, 1989).

More companies value the health of their employees now than ever before. This is documented by the number of companies that have joined the Association for Fitness in Business. The AFB started with 40 members in the early 1970's and has now grown to over 1,000 members (Howell, 1985).

Benefits of Wellness Programs

Studies show the following benefits are gained by companies that have wellness programs: employees use less sick time, employees are more productive because of an increase in morale, and there is a decrease in probability of total disability (Griffin and Ziegler, 1986). Leepson stated that in companies that develop wellness programs, their employees were happier and healthier; therefore, the employees were more productive (Leepson, 1988).

Besides an increase in employee productivity, studies showed wellness programs potentially lowered the medical insurance cost to companies. A healthy employee needed less medical care which means less insurance costs to the company (Leepson, 1988). A study done by the Travelers Insurance Company at eight companies in Ohio, involving 4,700 employees showed, "there is a clear relationship between employee health habits and their health insurance rates...the higher the health score of the employee, the lower the health insurance costs" (Leepson, 1988). Companies are interested in the health insurance costs of their employees, but they are also concerned with the total cost to replace an employee. The Xerox Corporation estimates it costs their corporation between $600,000-$800,000 to replace a top executive who dies. Not only are insurance costs calculated in this estimation, but an estimation of the cost of replacing the knowledge and experience contained by the executive (Griffin and Ziegler, 1986). Executives between the ages

of 35-55 are more likely to be disabled or even die from a heart attack brought about by job related stress. The loss of this executive brings about something that cannot be replaced by money, knowledge and experience (Brown, 1988). Besides improving productivity and saving on health care costs, the following are listed as reasons for offering wellness programs also: recruitment and retention, marketing image of the company, and improves employee morale (Howell, 1985).

Research on Wellness Benefits

Research documenting that wellness programs increase productivity in employees while decreasing medical insurance costs is scientifically inconclusive. However, there have been studies performed that have concluded there was a relationship between employee wellness and the benefits cited. The Tenneco Corporation of Houston cited in a study done from October 1, 1982, to March 31, 1983, there was a "positive, although probably non-casual relationship between exercise adherence and above job performance" ("New Fitness Data," 1984). Some of the conclusions coming out of the Tenneco study were:

1. Exercising employees had less sick hours than non-exercising employees. Exercising females missed 46.88 sick hours annually, while the non-exercising female missed 69.42 sick hours annually. The exercising male missed 24.53 sick hours annually, while the non-exercising male missed 30.10 sick hours annually.

2. Absenteeism decreased with age among exercising employees, while absenteeism increased with age in non-exercisers.

3. Employee medical insurance claims were highest among non-exercisers. The annual cost of claims on non-exercising females was $1,558.83, while the average cost of female exercisers was $639.07. The annual average cost of claims of the non-exercising male was $1,003.87, while the average cost of the exercising male was $561.68 ("New Fitness Data," 1984).

Other examples of wellness programs and their effects on employees were:

1. NASA documents a fitness program resulted in a 52% increase in productivity of program participants.

2. The Los Angeles Fire Department has mandatory participation in a wellness program. Results have been a significant decrease in the blood pressure and cholesterol levels of the firemen.

3. New York Telephone cited a $2.7 million saving in absent worker cost and medical claims in exercising employees as compared to non-exercising employees (Kaman, 1987).

As health insurance costs continue to rise, employers are finding that providing wellness programs are encouraging employees to stay healthy (Thompson, 1989).

Not only do exercisers save corporations money, also money is saved the national government on hospitalization programs. In a recently published study, Rand Corporation

researchers estimate that the "above average" exerciser saves the government $1,900 over the course of their lifetime. Exercisers use hospitals less. The Rand Corporation states, "Our results provide an economic rationale for the government spending on recreational facilities that encourage a more active lifestyle" (Burfoot, 1990).

Evaluation of Wellness Programs

Comprehensive wellness programs have two dimensions: assessment and intervention. While programs vary in scope, each should attempt to reach these two goals by assessing one's physical condition and attempt to intervene to prevent or correct any malady.

Organizations use different means of assessing one's fitness level. However, the procedures used generally fall into one of the categories listed below:

1. Microcomputer programs - programs range from a simple cardiovascular risk assessment to a comprehensive medical review.

2. Physiological health assessment - this is done by a medical doctor who is on the staff of the wellness center or by a trained technician. Fitness components measured vary, but usually consist of resting heart rate, blood pressure at rest, percent of body fat, and oxygen consumption.

There have been numerous attempts to justify programs by measuring the cost effectiveness of the program to the

employer. However, the true value of the program may be in non-monetary returns. Programs tend to lower employee absenteeism, which produces higher productivity because the employee is on the job. While it is difficult to measure employee productivity, some wellness programs are using a "perceived productivity" rating scale, similar to the Borg Perceived Exertion Scale. By doing so, the company is giving the employee a chance to evaluate and, hopefully, improve on their productivity level (Richardson et al., 1986).

Wellness Programs in Education

Research citing the benefits of wellness has been concentrated on industry and business; little research documented the effect of wellness programs on higher education.

A study performed by the New York State Board of Education concluded elementary and secondary teachers participating in a fitness program experienced a 55% drop in sick leave (Kaman, 1987).

While education lags behind in wellness programs, it is obvious that academic institutions are committed to programs. According to a survey conducted by the University of Wisconsin at Stevens Point, 20% of higher education institutions now have wellness programs. Robert H. Rosen of George Washington University stated, "It is clearly not a fad, both science and economics support the development of these programs." Academic officials predict that wellness programs for faculty will be looked on as a job benefit by professors (McMillen, 1986).

School site health promotion provides both academic and financial benefits. Since costs for medical care are borne by school districts or the employing school, it makes sense that wellness benefits in education are the same as in industry and business. While the direct costs of health insurance are highly visible, hidden costs of absenteeism, disability, turnover, decreased productivity, and faculty/ staff recruitment and replacement must be considered.

Teachers who have participated in worksite health promotions report improved attitudes about their personal health, increased perceptions of general well-being, decreased absenteeism, improved morale, and improvement in the quality of instruction.

In a study performed by the Institute for Aerobics Research, it was found that treatment group teachers scored better on several physiological variables than control teachers. After a 10-week intervention program consisting of exercise and counselling, the study showed the following health improvements in the treatment group over the control group: a mean increase of 1.2 minutes on treadmill time, a mean increase of 32 pounds on the bench press, a mean weight loss of 4.5 pounds, and a mean body fat loss of 4.5%. Besides these physiological improvements, treatment group teachers indicated greater job satisfaction, higher self-esteem, and handling of stress in a more positive manner. Furthermore, 68% of the treatment group reported improvements in dietary behavior and 18% of smokers had quit

(Blair, Tritsch, and Kutsch, 1987).

Wellness research in education has also been concentrated on students. Student wellness programs vary between academic courses, college health services, physical education activity courses, programs at resident halls, and campus wide comprehensive programs involving testing and fitness programs.

The benefits of wellness programs to students are similar to those benefits derived from wellness programs in business. Students participating in wellness programs miss less class time due to illness, new students tend not to experience homesickness as bad as non-participants, and participants tend to perform better in the academic classroom (Ardell, 1979).

Arguments For and Against Wellness Programs

While research supports wellness programs as beneficial to both employee and employer, to date, there has not been a scientific conclusive study proving wellness programs as cost efficient to the business and actually improving employee productivity. Literature, thus far, has been based on medical research dealing with the healthful benefits of exercise adherence and smoking cessation (Griffin and Ziegler, 1986). Thomas J. McDonough, Vice-President of Medical and Environmental Health of the Exxon Corporation, states, "Although much enthusiasm exists for these various health maintenance and wellness programs, there is little objective evidence to indicate their place as a cost effective tool in preventive medicine" (Kaman, 1987). Nelson adds

it is difficult to find well-controlled studies because researchers are often more interested in trying to prove that fitness programs reduce corporate health costs than they are in trying to prove that programs help enhance individual fitness (Work, 1989). Skeptics of wellness programs for employees cite three reasons for not starting programs for their employees. One reason stated is there is not conclusive evidence that wellness programs actually save money when the start-up costs are calculated along with savings in health care claims. Secondly, it is claimed the percentage of employees using the centers does not justify the expense. Last of all, skeptics claim that those who use the centers are the ones who need the centers the least (Leepson, 1988).

The Travelers Insurance Company hopes to be able to prove with data that wellness programs are cost effective. In February 1987, the company opened a center to their 12,000 home office employees in Hartford, Connecticut. The center is called the Taking Care Center and the health promotion program is called the Taking Care Program. Presently 3,200 employees or 38% of the home office employees are exercising and participating in health programs at the center. The Travelers have invested over $2 million in the center. In 1987, the company estimated that for every dollar invested in employee health promotion, there was a return of $2.50-$3.00 in reduced physician fees and health care claims. By having their own center and research team,

The Travelers are approaching the 1990's attempting to prove that wellness programs are cost effective to business ("Can Employee Fitness," 1988).

While it is debated whether wellness programs actually save money, the programs are beneficial in terms of employee morale. Thomas Golaszewski, Director of Research for the Center for Corporate Health Promotions, states the programs are beneficial because the attitude of the worker is positive towards the company providing the service (Leepson, 1988). Braun states that saving money should not be a corporation's only reason for establishing a wellness program or a fitness center at the job site. He states that a center or a program builds morale, and it sends a message to the employees that the company cares about their well-being (Braun, 1984). To further illustrate this point, the Puget Sound Health Systems Agency surveyed 31 businesses nationwide. The businesses indicated, regardless of cost, they would continue the program because of the program's positive effects on employee morale (Kaman, 1987).

While the future of wellness programs is unclear, most experts agree that wellness programs are here to stay. Corporations will continue to stay involved because some companies feel they can save money by having employees exercise, while others view it as a job benefit for employees. Johnson states that programs will continue to expand because the pool of employable people is shrinking in numbers; because of this, corporations must place more emphasis on

keeping the employees they have happy and healthy (Work, 1989).

Evaluation of Teachers

Education is under public scrutiny. Declining standardized test scores on the part of students and claims of incompetence against teachers has brought education into public awareness. The public demands educators be responsible for the results of their classroom. Accountability is defined as being responsible for one's actions (Safrit, 1986). The definition indicates an educator is responsible for the learning that does or does not take place in their classroom.

There are several reasons for evaluating teachers. One of the reasons is to provide personnel information. This information is used for promotions, reassignments, and terminations (Shields, 1984). Another reason for evaluating teachers is for professional growth. Evaluations provide feedback to the teachers so they know in what areas of their instruction improvement needs to be made. Most evaluations are performed for accountability reasons. One goal of evaluation is to identify incompetence. Once minimal competency is met, the teaching ability of teachers tends to be forgotten. In actuality, the evaluation needs to be used as a growth system, not just a tool to identify competence (Striggins, 1986).

Finn also cites reasons why teachers need to be evaluated. One of the reasons is a coddled faculty. A coddled faculty is described as one whose members tend to

do little work, especially on behalf of the institution which pays their salary. Not only are faculty members spoiled by not having to spend much time teaching, they spend little time in research to advance human knowledge. Also, institutions of higher education spend huge sums of money on matters of internal governance, but tend to neglect the most important aspect of higher education, and that is insuring quality teaching which brings about learning. Part of the reasons for the previously cited problem is the inadequacy of measuring performance. Instruments to measure teacher performance and measure the product of the institution are inadequate (Finn, 1984).

Factors Affecting Teacher Evaluations

The reliability of student evaluations of faculty has been questioned. Reliability is defined as a consistency in measurement (Safrit, 1986). Reliability coefficients ranging from .80 to .90 have been recorded on student evaluation of faculty. According to Safrit, this is a high correlation (Safrit, 1986). Well constructed evaluation instruments are deemed reliable. Higher education appears to look favorable upon student evaluation of faculty to determine the performance of a teacher. Educational administrators are operating on the assumption that student evaluations are valid representations of the student's educational experience (Shields, 1984).

Another factor questioned about student evaluation of faculty is the validity of the evaluation instrument and evaluation process. A measuring instrument and evaluation process is valid if it measures what it purports to measure (Baumgartner and Jackson, 1987). Student evaluation of teachers should evaluate a teacher's effectiveness. Effective teaching could be defined as a student progressing toward a stated goal or objective of a teacher. Regardless of whether the goal comes from the teacher, the department, or the profession, a student's progress toward accomplishing that goal is a determining factor of effective teaching (Shields, 1984).

Outside factors affect validity and often these factors are not under the control of the teacher (Shields, 1984). An example of an extemporaneous factor not under the control of the teacher would be the characteristics of the individuals who are evaluating the teacher. To assume a test to be valid, the examinees must be similar in age, gender, and all must be of the similar experiences (Baumgartner and Jackson, 1987).

Besides the measurable factors of reliability and validity, other problems affect evaluations done by students. Student evaluations are often biased based on age, gender of the teacher, appearance of the teacher, subject matter taught, and class size. Middle aged, unattractive females and older unattractive males receive lower ratings. Teachers of small class size receive higher evaluation

rating than teachers of larger classes. Also, teachers of math and sciences receive lower evaluations than those in the humanities, fine arts, and languages (Shields, 1984).

First impressions the students have of the teacher appear to form lasting impressions on the students. Students tend to look for characteristics and actions of teachers to support their feelings (Shields, 1984). Physical educators must exhibit themselves healthy through positive lifestyle practices to optimize their teaching effectiveness (Brandon and Evans, 1988). The importance of the first impression is exhibited in a study done by Mellville and Cardinal. In the study cited, an instructor was explaining and demonstrating information about flexibility and weight control on a 20-minute videotape. The same instructor explained the same information on another tape, except this time the instructor was made to look overweight by wearing a "fat suit". The tapes were shown to high school health classes. One group saw the fit instructor and the other group saw the fat instructor. After viewing the respective tape, the students were asked to evaluate the instructor. The seemingly fat instructor not only evaluated lower than the fit instructor, but on a quiz covering the material, students in the fat instructor's class averaged 72% and the students in the fit instructor's class averaged 85% (Melville and Cardinal, 1988).

Another problem of evaluation of teachers is that some feel that evaluation diminishes creativity in a teacher. Bryant states that intrinsic motivation is conducive to creativity, but extrinsic motivation is not conducive to creativity. He further states that evaluations are extrinsic motivation and are not likely to lead to a creative product or performance (Bryant, 1989).

Shulman states that evaluation of teachers grows out of behavioral and generic views of teaching. These generic views of teaching involve observing measurable classroom behavior. Teaching is distinctly different in certain disciplines. The particular kinds of learners and the character of the setting also influence the type of instruction that takes place. "Teaching involves reasoning, it is an intellectual and imaginative process, not merely a behavioral one." Therefore it is difficult to measure the amount of teaching that has occurred (Shulman, 1987).

Methods of Evaluating Teachers

College teachers are evaluated by administrators, students, peers, and by self evaluation (Striggins, 1986). The most used form of evaluation is administrative evaluation. Stier found that 94% of surveyed institutions used this form of teacher evaluation (Stier, 1986). Many institutions of higher education are putting faith in student evaluation of a teacher's performance (Shields, 1984). Stier found that 84% of surveyed institutions used student evaluations, 57% used self evaluations, and that 53% used peer evaluations

(Stier, 1986). Reasons why faculty shy away from evaluating each other is because of (1) professional courtesy, (2) fear they do not know the other's specialty well enough, (3) respect for academic freedom, and (4) a general distrust of peer evaluation ("Observing and Evaluating," 1987).

Student evaluation of faculty is usually done by a closed end questionnaire. The student is asked to respond to general statements about the teacher's performance (Appendix H). A student evaluation of faculty that is used by administrators is usually done to measure accountability on the part of that faculty member. Evaluations such as these are of little use to the faculty member. When a teacher is allowed to see the evaluation and can discuss the results with the academic dean or teaching colleagues, the teacher experiences improvement in their teaching ability (Striggins, 1986). It has been found that when teachers are asked to evaluate themselves, the results of his or her evaluation compared to the result of the student's evaluation, usually closely agree (Shields, 1984). The basic purpose of the evaluations is to gain objective data to provide feedback to help improve teacher performance (Gustafson, 1986).

Videotape review is gaining popularity as an evaluation tool. It has been used regularly to evaluate teachers in Europe (United Nations Educational, Scientific, and Cultural Organization [UNESCO], 1981). It is also felt that videotaping accurately portrays the teaching process and viewing the videotape can be used by the teacher as a growth system

(Gardner, Miller, Clements, 1980). In 1984, Tennessee passed the Educational Reform Act which authorized the development of the Career Ladder System. Because of Tennessee's geographic size and the number of trained evaluators available, videotaping has been mentioned as a possible evaluative tool. A study showed that Career Ladder Teachers were neither strongly opposed nor supportive of video taping as an evaluation tool (Hartshorn, Prather, and Chance, 1988).

The Career Ladder Program mentioned in the previous paragraph uses a multiple data source for evaluations. It is felt that multiple data sources help control bias, promote objectivity, and provide adequate measurements of all areas of teacher competence. The procedure used by the Career Ladder Program for teacher evaluation is as follows:

1. The teacher is observed in the classroom six times by a trained evaluator.

2. Three dialogues occur between the evaluator and the teacher focusing on planning, teacher strategies, and evaluation procedure of students.

3. A summary of professional growth and leadership activities is engaged in by the teacher. This report is prepared by the teacher.

4. The teacher takes a written test on communication skills.

5. The principal of the school evaluates the teacher using a questionnaire developed for evaluation of Career

Ladder Teachers.

6. The students evaluate the teacher by use of a questionnaire that pertains to the learning that has occurred in the teacher's classroom.

7. A consensus rating of teacher competence is done by an evaluation team (Chance, Malo, and Pickett, 1988).

While the preceding procedure is used in secondary schools, it is quite extensive and could be adapted in a similar format to higher education.

Another form of evaluation used on teachers is where student behavior is recorded at set time intervals. These recordings are done while instruction is taking place. When student behavior becomes such that it is obvious they are losing interest in the material being presented, a change in teaching style should occur (Thomas, 1988).

Colleague evaluation is another procedure being used in the evaluation of college faculty. Most faculty members agree that student ratings are inadequate to judge the whole professor. While some argue that colleague evaluation demands excess faculty time and effort, others state it is awkward and would "pollute the academic atmosphere with suspicions and anxieties." While there is merit to these arguments, two of the best ways to evaluate a professor's classroom performance is examination of instructional material and classroom visitations (Seldin, 1984).

Self-evaluation for teaching improvement should be done informally after every class taught. The teacher should ask himself the following questions: How well did class go? Did I cover what I planned to cover? Did I explain effectively and did the students understand the difficult concepts presented today? Such questions make the teacher evaluate the day's performance (Miller, 1988).

Some teachers find video tapes and audio tapes of their classes helpful in evaluating their own performance. Giving students a rating form at the end of the first two weeks of class can help the teacher evaluate their performance. This rating form should help the teacher confirm that the students understand course requirements and that the teacher's presentation is effective (Miller, 1988).

Improving Teacher Performance Through Evaluations

Teachers' performances on evaluations and how reliable these performances are the subject of considerable debate. One fact that is of certain, there is a certain amount of displeasure that still exists about evaluation, although almost every institution uses some form of evaluation ("Observing and Evaluating," 1987).

Although different forms of evaluations are found to correlate well to each other, one of the problems of evaluation is that the evaluation process is done to try to determine teacher competence (Striggins, 1986). Evaluations have proved to be a valuable tool in improving faculty teaching when instructional counselors help faculty

interpret the data ("Observing and Evaluating," 1987). To further make the evaluation useful, all participants must agree with the goals and purposes of the evaluation (Conley, 1987).

Pigford reported as a principal, she attempted to guide the teachers to improvement through the following assessment questions:

1. Where are we now? This question involved looking at the previous year's achievement test scores and determining what improvements can be made.

2. Where do we want to go? This involved setting challenging, but attainable goals.

3. How do we get there? This involved developing a course of action to obtain the goals.

4. Did we make it? The answer to this question was assessing the performance at the end of the school year.

This procedure worked, because the school where she was principal improved from a 38% pass rate on the state achievement test to a 48% pass rate the year the four step evaluation plan was implemented (Pigford, 1987).

Besides evaluations, there are other measures a teacher can take to improve their instructional effectiveness. Some of the ways are (1) staying abreast with current trends in the profession, (2) planning programs and allowing the programs time to develop, and (3) maintaining enthusiasm and a high energy level ("Effective Teaching," 1985).

For teachers to really improve so as to receive higher evaluation marks, two things must be done:

(1) teachers must show students there is a genuine concern for the students' academic and intellectual growth, and (2) teachers must "practice what they preach."

In showing students there is a concern for their academic development, teachers must have high expectations for student performance. Teacher expectation influences student performance. Low expectations allow for uncorrected skill behavior and uncorrected unacceptable behavior (Gustafson, 1986). While the teacher expects a better performance from the student, in return, students tend to expect better performances from teachers. This necessitates the teacher to search for improved procedures to present the learning material with (Leggett, 1986).

Some educational leaders have stated to improve the classroom performance of teachers, the teacher should treat the classroom as a coach treats an athletic team. Adler states:

> The method of instruction throughout is that of coaching: with student performances corrected when they are poorly done and with insistance that the right way of performing be done over and over again until the requisite skill becomes a firm and stable habit of operation (Kraft, 1988).

Coaches feel directly responsible for the performance of their team, this feeling of responsibility is reflected in a coach's preparation for practice sessions and contests. If classroom teachers felt more responsible for the performance of their students, this would lead to better preparation on the part of the teacher. This personally imposed pressure

would result in teacher growth (Leggett, 1986).

Teachers operate under the misconception that learning takes place by listening to lectures and taking notes on what is said. "The problem in classrooms is the ever-talking teacher, who insists on dominating all the action with his talk, so that not much student performance goes on" (Kraft, 1988). When student performance is not occurring in a classroom, the teacher should be flexible enough to realize the learning situation is deteriorating, and make the appropriate changes to restore the learning situation (Gustafson, 1986). "Effective teaching and learning happens in those classrooms where real problems are being dealt with, where teachers are not constantly at center stage talking, dominating the action. These teachers model the skills they want their students to learn. They patiently explain things to their students and are eager to encourage them" (Kraft, 1988).

Teachers must exhibit the ability to perform tasks they expect from students. Teachers in academic subjects must exhibit expertise in the areas in which they have high expectations of their students. Health and physical educators are no exception to this. "What teachers are communicates more than what they say; and, role modeling of desired behavior has a stronger modeling effect than verbal instructions" (Whitley, Sage, and Butcher, 1988). Ostro states values are not easily conveyed, but are better taught by example. This behooves physical educators to exhibit healthy life-

styles to optimize teaching effectiveness (Brandon and Evans, 1988).

Brandon and Evans studied the fitness levels of physical educators in Bibb County, Georgia. Sixty physical educators participated in the study. The following fitness components were measured: cardiovascular endurance, muscular endurance, body composition, and flexibility. Cardiovascular endurance was measured using the Astrand-Rhyming protocol on a Monark bicycle ergometer. Muscular endurance was measured by having the subject perform modified sit-ups. This was a maximal test. The test was concluded when the subject could not maintain a continuous rhythm. Body composition was measured using a three-site skinfold test and analysing the scores using the Jackson-Pollock regression equation. Flexibility was measured using the sit-and-reach test. Measurements obtained from the tests were subjected to norms developed by Fox, Kirby, Fox and Georgia State University. The results of the tests showed women were in the good category in oxygen uptake; however, the men were in the poor category. Both men and women were above acceptable levels of fat. Flexibility was the only area where both sexes were above normal standards. Overall, the fitness levels of the physical educators studied was below average (Brandon and Evans, 1988).

Karper and Dignan addressed fitness levels of physical educators in 1983. A questionnaire was distributed to university and college physical educators. Only 51% of the surveys were returned. The questionnaire dealt with

exercise habits. Of the respondents, 85% of the males and 71% of the females reported they exercised regularly. However, the low response raises the possibility that the non-respondents did not exercise regularly (Karper and Dignan, 1988). Whitley, Sage, and Butcher performed a similar study. They sent a questionnaire to high school physical educators in Kern County, California. The results of the respondents showed 47% of males to be active in personal fitness programs and 61% of females being active in personal fitness programs. The results of the study prompted them to recommend more studies specifically designed to determine the effects that fitness levels of teachers have on the fitness levels of students (Whitley, Sage, and Butcher, 1988).

While exercise habits of physical educators appear not to be as desired, the exercise habits of coaches appear to be more as one would expect from this profession. A study performed by the University of Wisconsin-Oshkosh asked college and university head coaches with the state of Wisconsin these questions:

1. Do you participate in a planned exercise program?
2. How often do you exercise on a weekly basis?
3. How many minutes are typically spent in exercise each workout session?
4. How would you rate your current physical condition?

Of the respondents, 89% of females and 79% of males indicated they participate in a planned exercise program.

Eighty-eight percent of coaches indicated they exercise three or more times weekly. In response to the duration of an exercise period, 63% exercised 45 or more minutes, 24% exercised 30 to 35 minutes, seven percent exercised 15 to 30 minutes, and six percent exercised less than 15 minutes. Eighty-seven percent reported their fitness level was good or excellent.

The study also determined 45% of higher education personnel in Wisconsin exercise three or more times weekly compared to 89% of the head coaches (Inciong and Flood, 1986).

If physical educators wish to improve the fitness levels of school-age children, thus improving the teaching perception of the discipline, physical educators must become examples by participating in good health habits and maintaining good fitness levels.

Summary of Review of Related Literature

While there is not a conclusive study which proves wellness programs for employees save employers money, enough research has been documented showing there is a relationship between wellness programs and money savings by employers.

Educational accountability has brought about evaluation of teacher performance in the classroom. To be effective teachers, it behooves every educator to stay abreast of findings about evaluations and to also consider evaluations done on themselves to determine what areas of their performance needs attention.

CHAPTER 3

Methods and Procedures

Subjects

All male faculty who taught 12 or more semester hours were eligible to participate in this study.

A list of full-time male faculty was secured from the Vice-President of Academic Affairs (Appendix A). Each eligible faculty member was forwarded a personalized letter explaining the purpose and the procedures of the study. The letters to the faculty members were mailed on February 28, 1989 (Appendix B). If the faculty member elected to participate, an appointment was made with the researcher for a fitness assessment.

Collection of the Data

Fitness Assessment

When an appointment for the assessment was made, the subject was instructed to report appropriately dressed for exercise. Upon reporting, the subject signed a form giving the researcher permission to use data from their student evaluations (Appendix C).

The following data were collected during the fitness assessment: age, height, weight, resting heart rate, systolic blood pressure, diastolic blood pressure, flexibility, muscular endurance, percent of body fat, and cardiovascular

endurance.

The paragraphs that follow detail the procedures used in the collection of data from the fitness assessment.

Blood Pressure

Systolic and diastolic blood pressure were measured at rest, using an aneroid sphygmomanometer. The average of three trials was used to represent the resting systolic and diastolic blood pressure.

Flexibility

Flexibility was measured using the sit-and-reach test. This test was selected because of its practicality; it is easy to administer and has a high degree of reliability (Hoeger, 1988). Kraus and Raab report a high degree of flexibility in the lower back and hamstrings was necessary to prevent injury to the lower back. The sit-and-reach test has proven to not only be a good measure of total body flexibility, but also a reliable predictor of lower back problems. People with higher lower back and hamstring flexibility tend to have less lower back problems than those with low back and hamstring flexibility (Baumgartner and Jackson, 1987).

In this study, after a brief stretching period, the subject was given three trials on the sit-and-reach test. The highest of the three trials was considered the subject's flexibility.

Resting Heart Rate

Resting heart rate was determined using a heart rate monitor. The subject was asked to sit in a chair, an electrical sensor was attached to the ear lobe. The heart rate was observed for 60 seconds. During this time, the subject refrained from talking and remained as still as possible. The resting heart rate used in the assessment was the rate displayed on the monitor at the conclusion of the 60 seconds.

Muscular Endurance

In this study, the one minute sit-up test measured muscular endurance. The modified sit-up was performed to eliminate the possibility of lower back hyperextension (Baumgartner and Jackson, 1987).

When administering the sit-up test, the subject laid on the sit-up board with his feet secured. The subject was instructed to bend his knees, fold his arms, and place his hands on top of his shoulders. Upon the command to begin, the subject performed as many sit-ups as possible in 60 seconds. A sit-up was counted each time the subject's back contacted the sit-up board.

Cardiovascular Endurance

The cardiovascular endurance of each subject was measured by having the subject perform the Fox protocol on a bicycle ergometer. This protocol was a submaximal test. A Bodyguard ergometer was used. Predicted oxygen consumption was calculated using the Fox equation. The

Fox equation was used instead of the Astrand-Rhyming nomogram because of a lower error rate. The Astrand-Rhyming nomogram has been found to have an error rate of 15% in predicting maximal oxygen consumption. The Fox Equation has been found to have an error rate of 7.7%. The Fox Equation used the following formula:
Maximal Oxygen Consumption = 6.3 - (.0193 X HR5). In the above equation, HR5 represents the heart rate at the conclusion of the fifth minute of exercise (Bower, Foss, and Fox, 1987).

During the test, the subject sat on the seat of the bicycle ergometer and the seat height was adjusted so that on the downstroke of pedaling, the subject's knee was extended. The test duration was six minutes with the subject pedaling against a resistance determined by the subject's heart rate. Following the six minutes of pedaling, each subject cooled down for two minutes. The cool down consisted of pedaling against no resistance.

During the Fox Protocol, the subject pedalled at 50 revolutions per minute. The resistance was set at 300 kpm/minute at the beginning of the test and increased 300 kpm/minute or until the subject's heart rate equaled 120. A correction factor, shown in Appendix D, was used to predict oxygen consumption for subjects over the age of 25 (Safrit, 1986). Absolute oxygen consumption was calculated in liters, then relative oxygen consumption was expressed in milliliters per kilogram of body weight.

Percent of Body Fat

Percent of fat was determined using seven skinfold sites. The sites used were the chest, axilla, triceps, subscapula, abdominal, suprailliac, and thigh. Each site was measured three times with the average of the three measurements used in the body fat computation. All skinfold measurements were done using a Lange caliper.

The percentage of body fat was computed using a computer program from Human Factors Software. The program used the Jackson-Pollock formula to calculate body fat. The printout provides useful exercise prescription information on the subject. The information provided in the printout was based on the percentage of body fat of the subject (Faria, 1986). Each subject received a copy of the printout.

Age, Weight, and Height

Each subject was asked his age. Weight was measured using a Toledo balance scale. The scale was calibrated before each subject was weighed. Height was measured using the stadiometer attached to the scale.

Recording the Data

The same format of data sheet was used to record the data for each subject (Appendix E). Once data were collected, results and interpretations were revealed to the subjects. The subjects received a personalized letter detailing their fitness level based on the data collected (Appendix F). Since most of the subjects possessed little knowledge to

interpret physiological data, a sheet detailing the meaning of each variable was given to each subject (Appendix G). To further facilitate interpretation, each subject's results were compared to percentiles developed by Dr. Ken Cooper and the YMCA. This was done so each subject could compare his performance with other individuals in his age group. These facts were presented to each subject in the personalized performance letter mentioned above.

Determining Teacher Effectiveness

Teacher effectiveness was determined by using the composite score of the student evaluation of the faculty.

The instrument used to evaluate faculty members has both closed and open ended questions (Appendix H). Students rate the faculty from one to five in response to certain statements about the teacher's classroom performance. In the rating, the number one represents a student strongly disagreed with the statement. The number five meant the student strongly agreed with the statement. The response N/A, not appropriate, was also available for the students to mark.

Questions 1-17 dealt with the teacher's classroom behavior, presentation of material, and value of the course to the student. Questions 18 and 19 dealt with the student's overall grade point average and the grade expectation for the course. The back of the questionnaire had two open ended questions where the student wrote statements about the teacher's classroom performance and the value of the

course. Results of the evaluations were available to the Academic Dean, the faculty member's department chair, and the faculty member.

All teachers were evaluated in each course they taught. Each student enrolled in the course had the opportunity to evaluate the teacher. The evaluation was done at the end of the course. The teacher does not handle the evaluation so the students do not feel intimidated by his presence. This also insured the evaluation results were not tampered.

The composite average of closed ended questions 1-17 were used as the teacher effectiveness score in the study.

Analysis of the Data

Each fitness assessment was correlated with the faculty member's composite student evaluation score. To determine significance, each correlation result was subjected to a one-tailed test of significance. To determine which physiological variable correlate highest to the evaluation scores, a stepwise regression was performed. In this regression, variables that do not highly correlate were deleted from the equation.

All statistical analysis was performed on the VAX mainframe computer at David Lipscomb University. Analysis used the Statistical Package for the Social Sciences (SPSS). The .05 level was used to determine significance.

CHAPTER 4

Results and Discussion

Analysis and Discussion of Data

Of the 17 academic departments at David Lipscomb University, 11 were represented in the study. The academic departments represented were: Bible, Business Administration, Chemistry, Education, English, Health and Physical Education, History, Math, Physics and Engineering Science, Sociology, and Speech Communication. Table 1 presents the number from each department that participated in the study.

The descriptive statistics for student evaluation scores and physiological variables are presented in Table 2.

Age

Of the 25 males tested, the mean age was 41.04 years. The standard deviation was 7.10. The range of subjects was between 28 and 55 years. When correlated with teacher evaluation scores, the r value was -.07, the level of significance was .37. Therefore, the null hypothesis stating there was no relationship between student evaluation score and age was accepted.

These findings do not substantiate the findings of other researchers who claim age influences ratings students give teachers. Shields stated that "age effects

Table 1

Academic Departments Represented in the Study

Department	Number of Participants
Bible	3
Business Administration	3
Chemistry	1
Education	1
English	1
Health and Physical Education	4
History and Political Science	2
Math	3
Music	1
Physics and Engineering Science	4
Sociology	1
Speech Communication	1
Total	N = 25

Table 2

Descriptive Statistics for Student Evaluation and Physiological Variables

Variable	Mean	Standard Deviation
Student Evaluation	4.21	.31
Age	41.04	7.10
Height	70.38	2.43
Systolic Blood Pressure	119.44	6.32
Diastolic Blood Pressure	76.6	4.65
Resting Heart Rate	68.68	9.99
Flexibility	9.10	3.93
Muscular Endurance	33.54	11.76
Percent of Body Fat	15.9	4.5
Absolute Oxygen Consumption	3.51	.46
Relative Oxygen Consumption	47.22	10.01

were substantial" on ratings given teachers (Shields, 1984).

Table 3 presents the subject's age and student evaluation scores. Table 4 illustrates the descriptive and correlation statistics. Figure 1 illustrates the degree of relationship between age and student evaluation scores in the study.

Height

The average height for the 25 subjects tested was 70.38 inches. The standard deviation was 2.43. The range for the height was between 66.5 and 76 inches. Table 5 lists the height for each subject and their student evaluation score. Table 6 lists the descriptive and correlation statistics and shows the relationship of height to student evaluation scores in this study.

Height had an r value of -.43 when correlated with student evaluation scores. When the height of the subjects was subjected to a one-tailed test of significance, the value obtained was .02. This value was statistically significant; therefore, the null hypothesis stating there was no relationship between height and student evaluation scores was rejected.

Since the r value was a negative number, this means the shorter the faculty member, the higher the evaluation score. This finding was not consistent with the findings of other evaluation studies which revealed the taller the teacher, the higher the evaluation of the teacher (Shields, 1984).

Table 3

Age and Student Evaluation

Subject	Age	Evaluation Score
1	49	4.01
2	45	4.15
3	46	4.24
4	54	4.61
5	48	4.05
6	43	4.30
7	36	4.24
8	39	4.19
9	32	3.95
10	36	4.56
11	39	4.49
12	40	4.51
13	38	4.01
14	42	3.47
15	28	4.82
16	34	4.54
17	34	3.94
18	43	4.18
19	35	4.22
20	39	3.83
21	47	4.30
22	55	4.09
23	39	3.70
24	33	4.32
25	52	4.47

Table 4

Summary Table for Age and Student Evaluation

Descriptive and Correlation Statistics
N = 25
dF = 23
Mean = 41.04
Standard Deviation = 7.10
R Value = -.07
Significance Level = .37

Range of Age and Student Evaluation		
	Age	Evaluation Score
Youngest Subject	28	4.82
Oldest Subject	55	4.09
Highest Evaluation Score	28	4.82
Lowest Evaluation Score	42	3.47

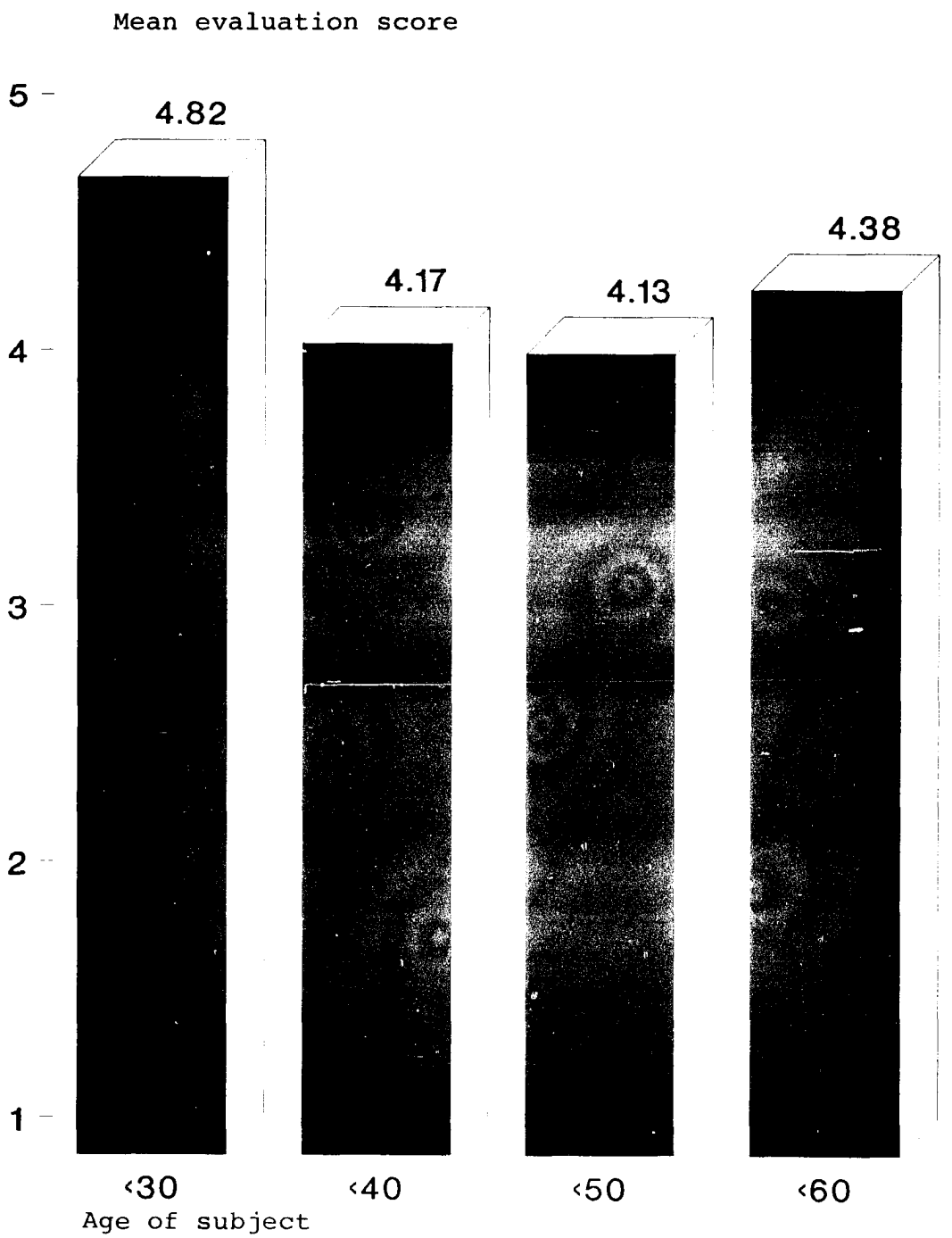

Figure 1

Age of subjects and mean student evaluation scores

Table 5

Height and Student Evaluation Scores

Subject	Height	Evaluation Score
1	76"	4.01
2	71"	4.15
3	72"	4.24
4	68"	4.61
5	73"	4.05
6	68"	4.30
7	68"	4.24
8	71"	4.19
9	72"	3.95
10	67"	4.56
11	71"	4.49
12	68"	4.51
13	72"	4.01
14	68"	3.47
15	67"	4.82
16	70"	4.59
17	74"	3.94
18	72"	4.18
19	72"	4.22
20	71"	3.83
21	73"	4.30
22	68"	4.09
23	71"	3.70
24	70"	4.32
25	67"	4.47

Table 6

Summary Table for Height and Student Evaluation

Descriptive and Correlation Statistics
N = 25
dF = 23
Mean = 70.38
Standard Deviation = 2.43
R Value = -.43
Significance Level = .02

Range of Height and Student Evaluation		
	Height	Evaluation Score
Shortest Subject	67" 67"	4.82 4.56
Tallest Subject	76"	4.01
Lowest Evaluation Score	68"	3.47
Highest Evaluation Score	67"	4.82

Figure 2 illustrates the degree of relationship that exists between the height of faculty and the student evaluation scores.

Resting Heart Rate

The mean resting heart rate for the 25 subjects was 68.68 beats per minute with a standard deviation of 9.98. The range for resting heart rate was between 51 and 87 beats per minute. Table 7 lists the subject's resting heart rates and student evaluation scores. Table 8 includes the descriptive and correlation statistics and illustrates the relationship that resting heart rate had to student evaluation scores.

Resting heart rate had an r value of -.25 when correlated to student evaluation scores. When subjected to a one-tailed test of significance, the value was .11. This value was not statistically significant; therefore, the null hypothesis stating that there was no relationship between resting heart rate and teacher evaluation was accepted.

Although this value was not significant, there was a relationship that will be discussed. The resting heart rate of the subjects when correlated with the student evaluation scores had a negative value. When interpreted, this value indicated that lower resting heart rates correlated with higher student evaluation scores. Lower resting heart rates are the result of an increase in stroke volume. When an individual has a greater stroke volume, more blood is pumped per heart beat; thus a person has

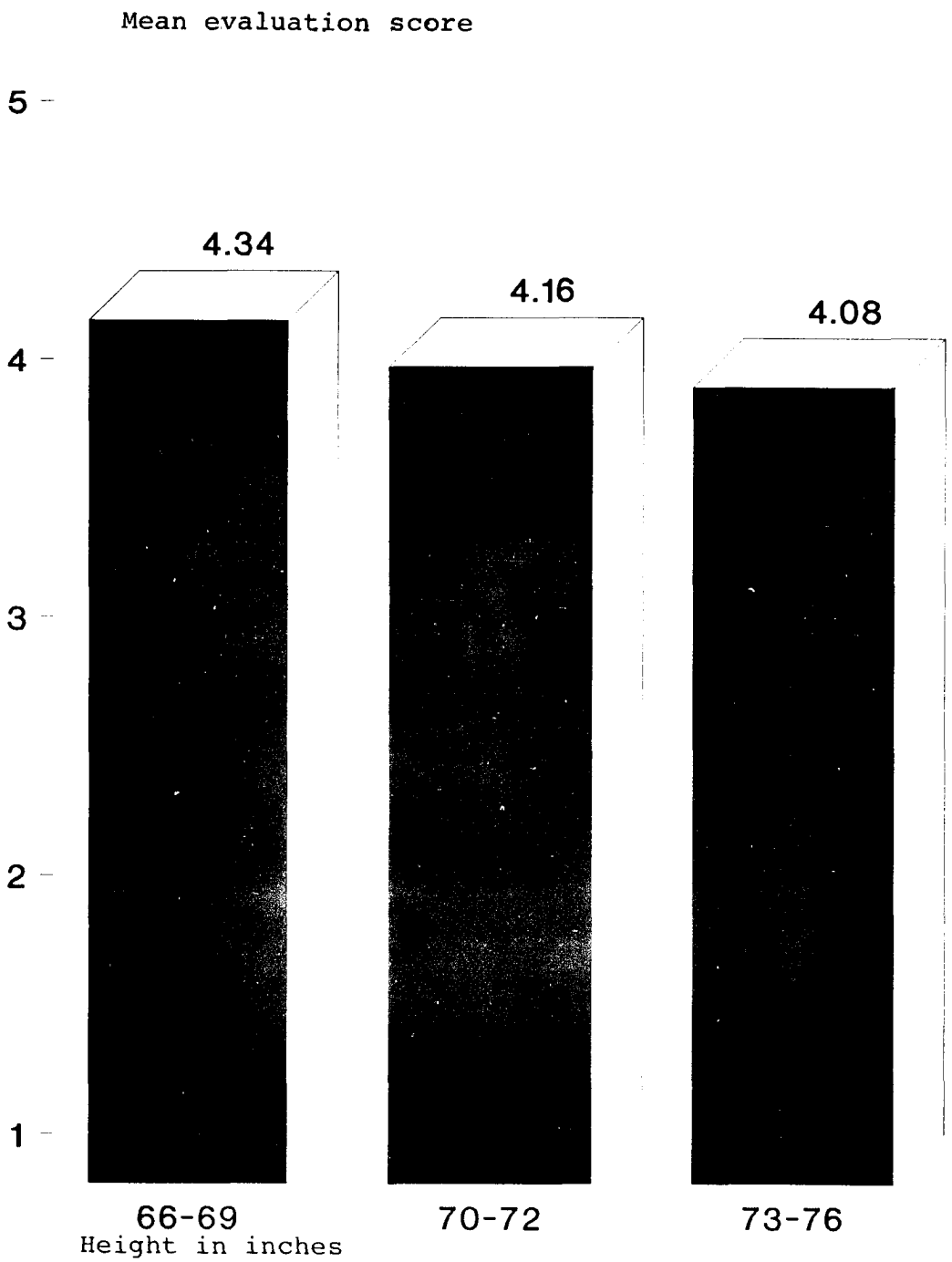

Figure 2

Height of subjects and mean student evaluation scores

Table 7

Resting Heart Rate and Student Evaluation Scores

Subject	RHR	Evaluation Score
1	87	4.01
2	72	4.15
3	69	4.24
4	61	4.61
5	83	4.05
6	58	4.30
7	80	4.24
8	80	4.19
9	72	3.95
10	80	4.56
11	60	4.49
12	76	4.51
13	62	4.01
14	70	3.47
15	60	4.82
16	58	4.54
17	69	3.94
18	87	4.18
19	59	4.22
20	62	3.83
21	60	4.30
22	70	4.09
23	69	3.70
24	51	4.32
25	62	4.47

Table 8

Summary Table for Resting Heart Rate and Student Evaluation

Descriptive and Correlation Statistics
N = 25
dF = 23
Mean = 68.68 beats per minute
Standard Deviation = 9.99
R Value = -.25
Significance Level = .11

Resting Heart Rate and Student Evaluation		
	RHR	Evaluation Score
Lowest Resting Heart Rate	51	4.32
Highest Resting Heart Rate	87	4.18
	87	4.01
Lowest Evaluation Score	68	3.47
Highest Evaluation Score	60	4.82

a lower resting heart rate. Figure 3 shows the degree of relationship that exists between resting heart rate and student evaluation scores in this study.

Systolic Blood Pressure

The mean systolic blood pressure was 119.44 mm Hg. The standard deviation was 6.32. The range for systolic blood pressure varied from a low of 106 mm Hg to a high of 132 mm Hg. When correlated to student evaluation scores, the r value was -.06. The significance level was .39. This value is not significant; therefore, the null hypothesis stating there was no relationship between systolic blood pressure and student evaluation scores was accepted.

Table 9 lists the subject's systolic blood pressure and student evaluation scores. Table 10 lists the descriptive and correlation statistics and illustrates the relationship that systolic blood pressure had to student evaluation scores in the study. Figure 4 illustrates the degree of relationship that existed between systolic blood pressure and student evaluation scores.

Diastolic Blood Pressure

Diastolic blood pressure had a mean value of 76.6 mm Hg. The standard deviation was 4.65. The range ran from a low reading of 66 mm Hg to high reading of 87 mm Hg. Table 11 lists the subject's diastolic blood pressure reading and student evaluation score. Table 12 shows the descriptive and correlation statistics for diastolic blood pressure and the relationship this variable has to the subjects.

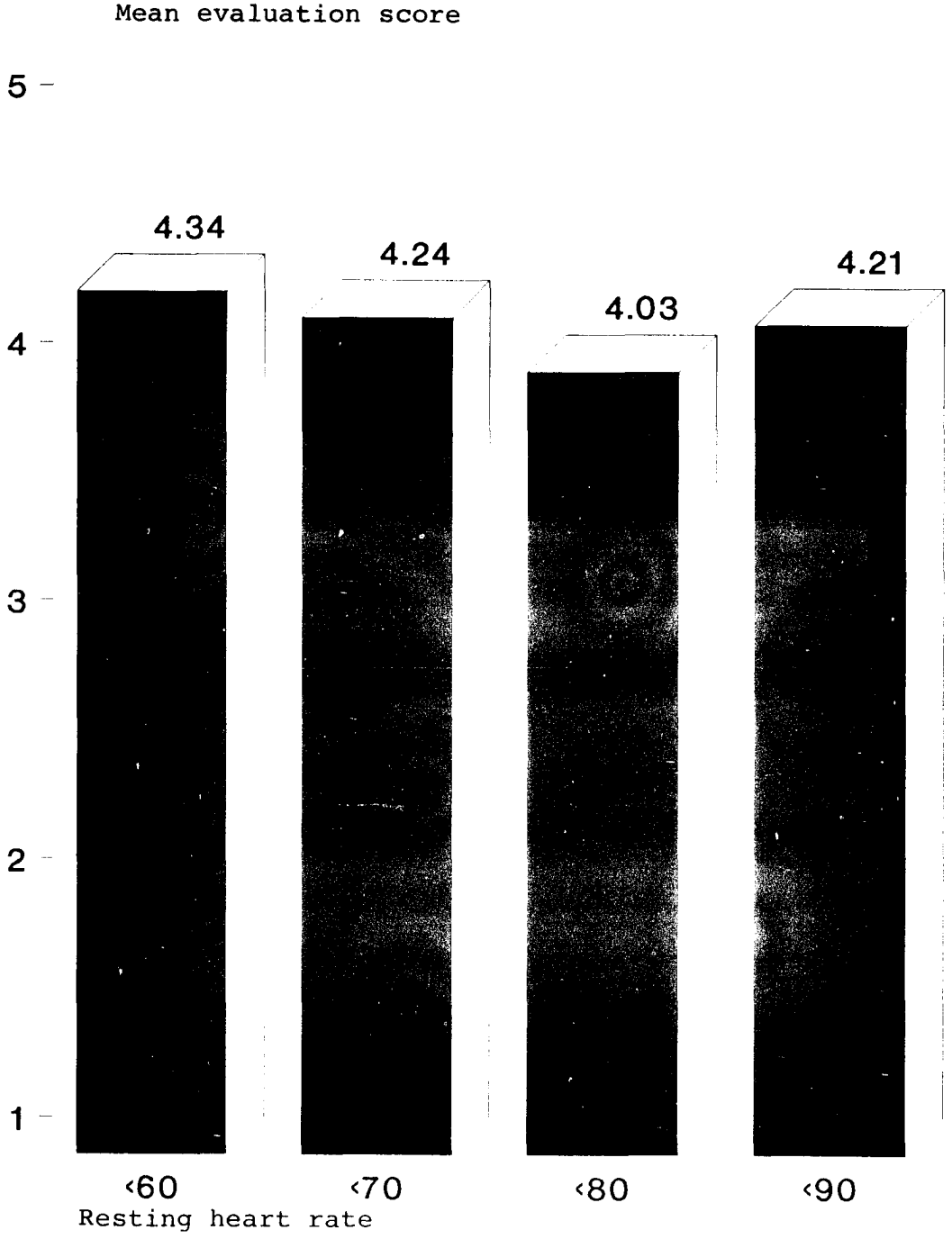

Figure 3

Resting heart rate of subjects and mean student evaluation scores

Table 9

Systolic Blood Pressure and Student Evaluation Scores

Subject	Systolic BP	Evaluation Score
1	130	4.01
2	120	4.15
3	119	4.24
4	118	4.61
5	125	4.05
6	116	4.30
7	115	4.24
8	116	4.19
9	126	3.95
10	128	4.56
11	108	4.49
12	111	4.51
13	122	4.01
14	106	3.47
15	117	4.82
16	116	4.54
17	120	3.94
18	132	4.18
19	120	4.22
20	126	3.83
21	116	4.30
22	116	4.09
23	118	3.70
24	123	4.32
25	122	4.47

Table 10

Summary Table for Systolic Blood Pressure and Student Evaluation

Descriptive and Correlation Statistics
N = 25
dF = 23
Mean = 119.44 mm/Hg
Standard Deviation = 6.32
R Value = -.06
Significance Level = .39

Systolic Blood Pressure and Student Evaluation		
	S.B.P.	Evaluation Score
Lowest Systolic B.P.	106	3.47
Highest Systolic B.P.	132	4.18
Lowest Evaluation Score	106	3.47
Highest Evaluation Score	117	4.82

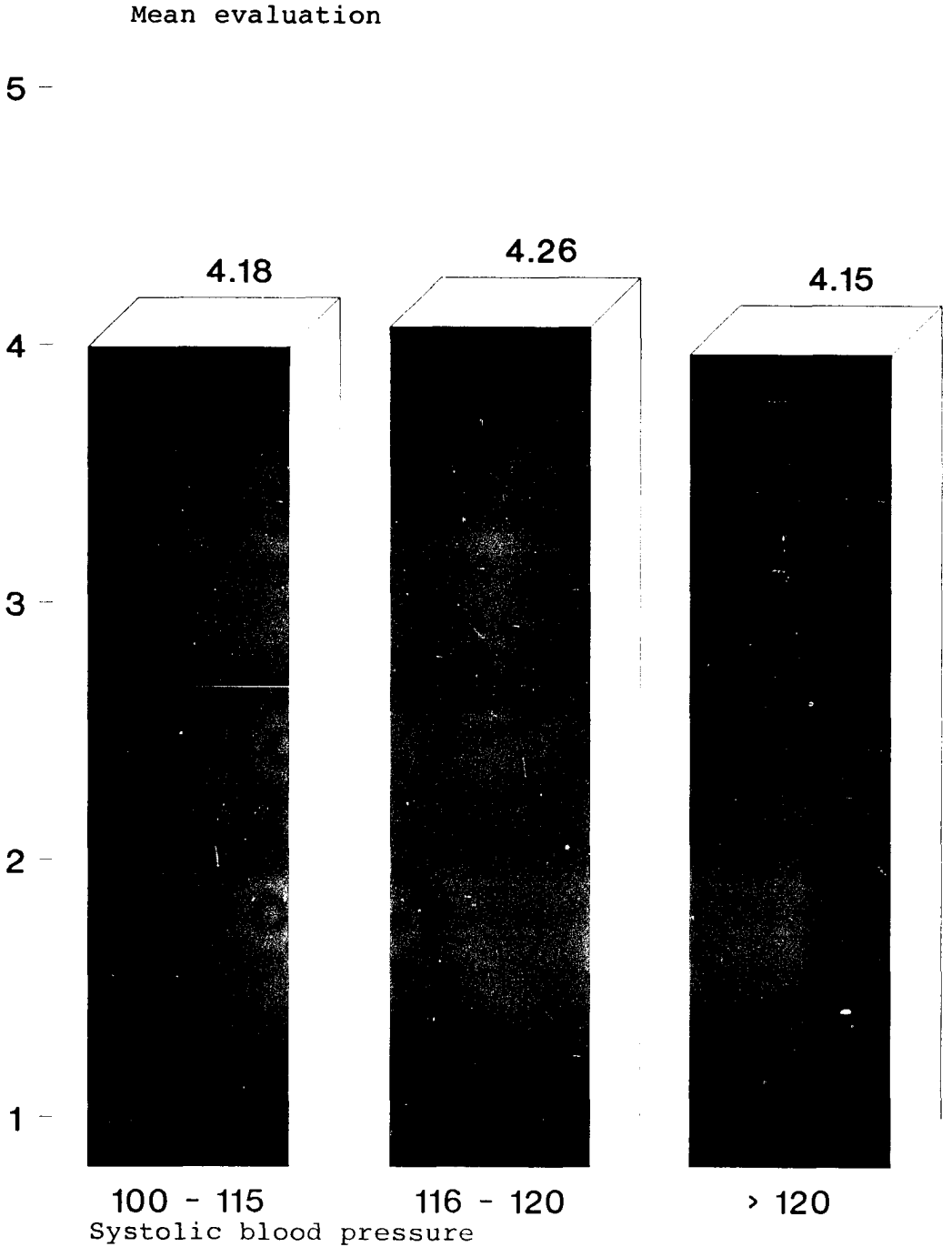

Figure 4

Systolic blood pressure readings and mean student evaluation scores

Table 11

Diastolic Blood Pressure and Student Evaluation Scores

Subject	Diastolic BP	Evaluation Score
1	82	4.01
2	76	4.15
3	74	4.24
4	78	4.61
5	87	4.05
6	76	4.30
7	73	4.24
8	78	4.19
9	76	3.95
10	76	4.56
11	72	4.49
12	82	4.51
13	74	4.01
14	84	3.47
15	66	4.82
16	72	4.54
17	72	3.94
18	76	4.18
19	80	4.22
20	80	3.83
21	78	4.30
22	78	4.09
23	78	3.70
24	69	4.32
25	78	4.47

Table 12

Summary Table for Diastolic Blood Pressure and Student Evaluation Scores

Descriptive and Correlation Statistics
N = 25
dF = 23
Mean = 76.6 mm Hg
Standard Deviation = 4.65
R Value = -.44
Significance Level = .01

Diastolic Blood Pressure and Student Evaluation		
	DBP	Evaluation Score
Lowest Diastolic Reading	66	4.82
Highest Diastolic Reading	87	4.05
Lowest Evaluation Score	84	3.47
Highest Evaluation Score	66	4.82

When correlated to student evaluation scores, diastolic blood pressure had an r value of -.48 and a significance level of .008. Because this value was significant, the null hypothesis of there was no relationship between diastolic blood pressure and student evaluation scores was rejected.

Interpreting this data illustrates that subjects with lower diastolic blood pressure readings had higher student evaluation scores. Figure 5 illustrates the degree of relationship that exists between diastolic blood pressure and student evaluation scores.

Blood pressure readings have been used as indicators of stress and hypertension. Since no blood pressure is being ejected during the diastole phase, this reading is often used by the medical profession as an indicator of stress in one's life (Hoeger, 1988). The American Heart Association lists the ideal blood pressure as 120/80 mm Hg. Any reading above 140/90 mm Hg is considered hypertensive (American Heart Association, 1986).

Flexibility

Flexibility was measured using the sit-and-reach test. The mean score was 9.1 inches. The standard deviation was 3.93. The range ran from a high of 14.7 inches to a low of no recordable flexibility. When correlated to student evaluation scores, flexibility had an r value of .23. The significance was .14. Since this value was not significant, the null hypothesis of there was no

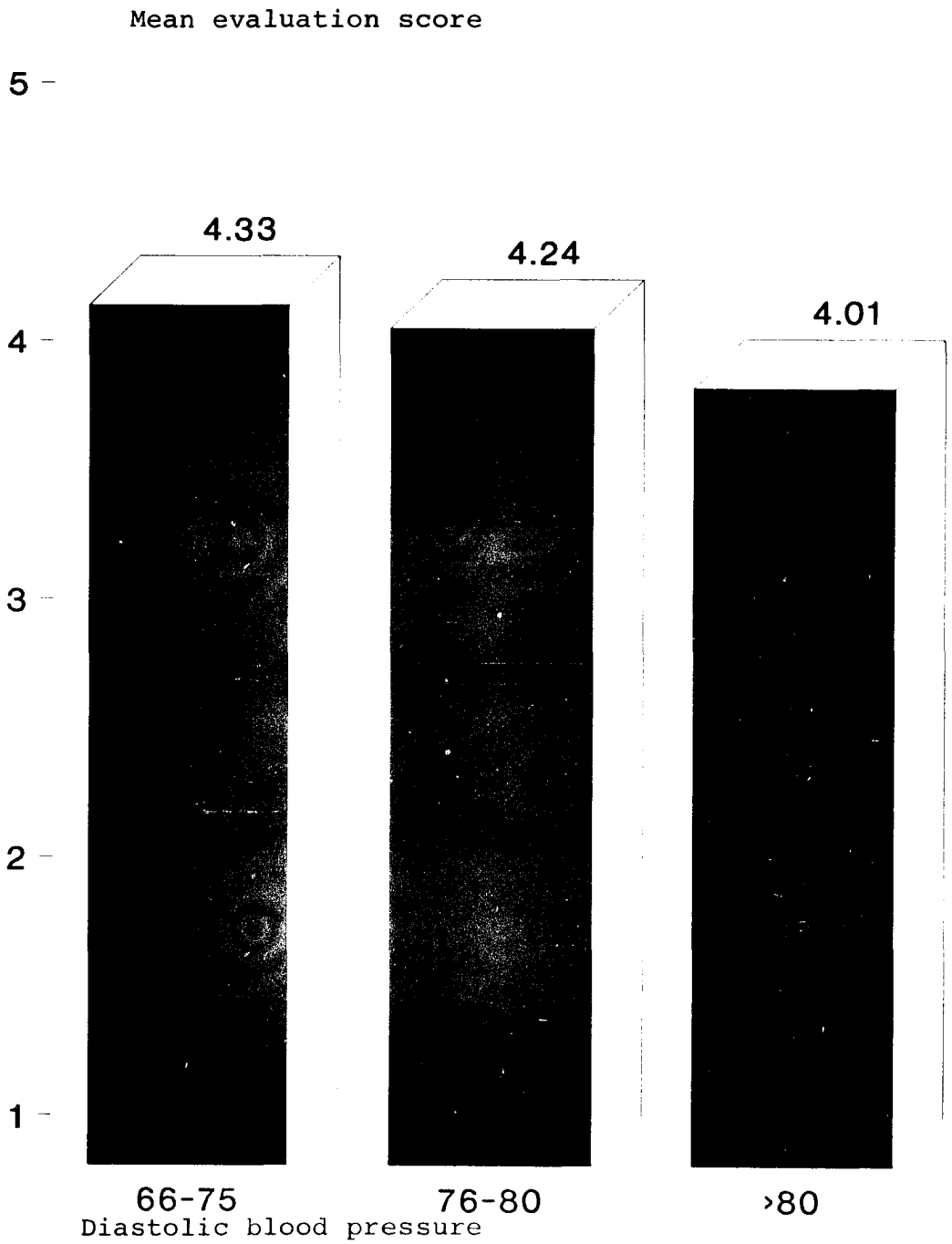

Figure 5

Diastolic blood pressure readings and mean student evaluation scores

relationship between flexibility and student evaluation scores was accepted. Table 13 lists the subject's flexibility scores and their student evaluation scores. Table 14 contains the descriptive and correlation statistics for this variable.

While there was no statistical significance between flexibility and student evaluation in this study, there was a trend for faculty members with higher degrees of flexibility to have higher student evaluation scores.

Figure 6 illustrates the degree of relationship that exists between flexibility and student evaluation scores.

Muscular Endurance

Muscular endurance was measured using the one-minute modified sit-up test. The mean for this variable was 33.54 and the standard deviation was 11.76. The range ran from a low of 17 to a high of 52. When correlated to student evaluation scores, the r value was -.24 and the significance level was .13. Table 15 lists the subject's muscular endurance and their student evaluation scores. Table 16 illustrates the descriptive and correlation statistics for muscular endurance.

Since the significance level of .13 was not statistically significant, the null hypothesis of there will be no relationship between muscular endurance and student evaluation scores was accepted.

Table 13

Flexibility and Student Evaluation Scores

Subject	Inches	Evaluation Score
1	10.2	4.01
2	12.2	4.15
3	11.4	4.24
4	13.4	4.61
5	1.8	4.05
6	14.7	4.30
7	9.1	4.24
8	9.5	4.19
9	4.3	3.95
10	11.4	4.56
11	10.6	4.49
12	8.7	4.51
13	2.0	4.01
14	10.0	3.47
15	1.0	4.82
16	8.3	4.54
17	5.1	3.94
18	12.2	4.18
19	14.0	4.22
20	6.0	3.83
21	10.0	4.30
22	13.0	4.09
23	11.0	3.70
24	0.0	4.32
25	7.5	4.47

Table 14

Summary Table for Flexibility and Student Evaluation

Descriptive and Correlation Statistics
N = 25
dF = 23
Mean = 9.1"
Standard Deviation = 3.93
R Value = .23
Significance Level = .14

Flexibility and Student Evaluation		
	Flexibility	Evaluation Score
Least Flexible Subject	0.0"	4.32
Most Flexible Subject	14.7"	4.30
Lowest Evaluation Score	10.0"	3.47
Highest Evaluation Score	11.0"	4.82

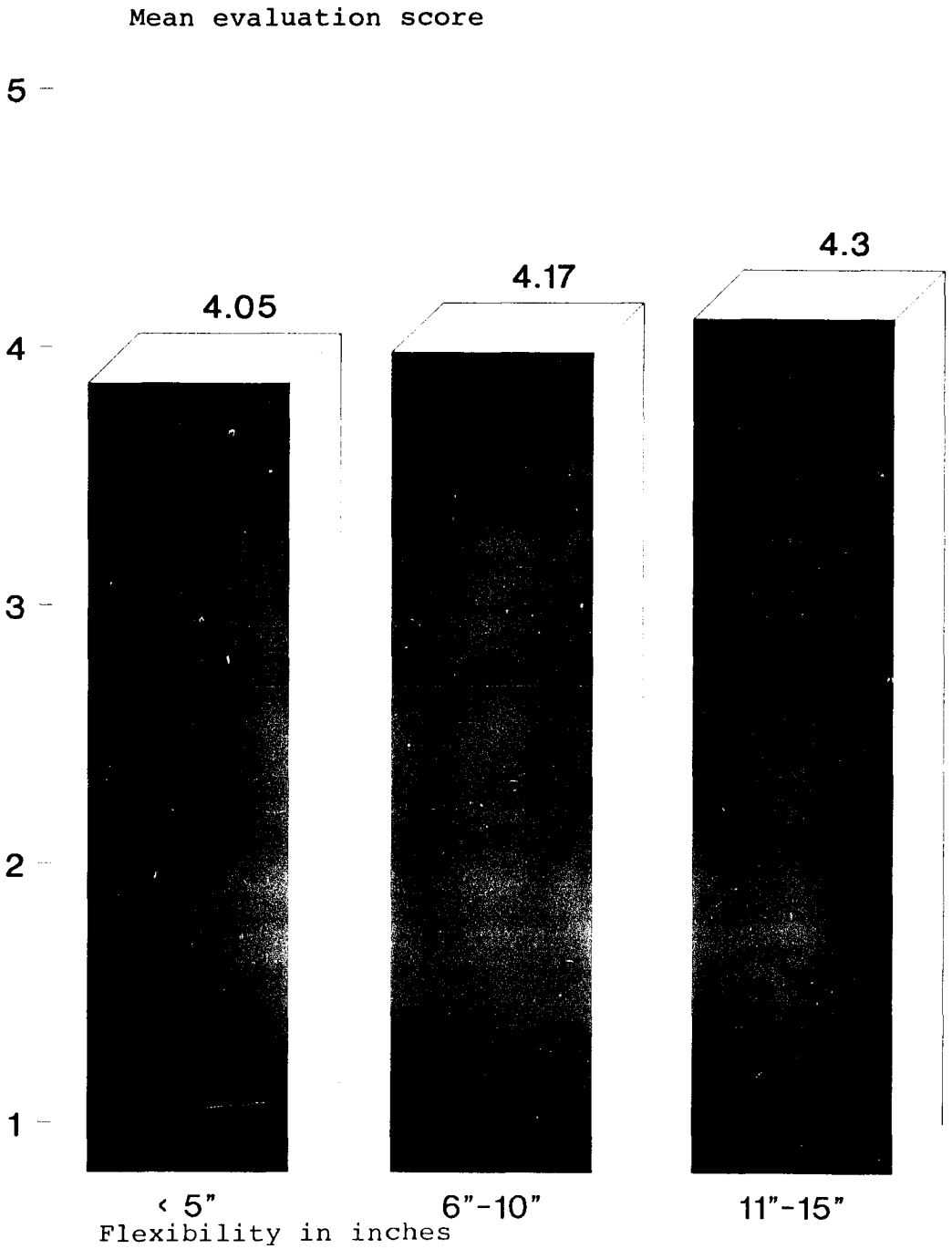

Figure 6

Flexibility of subjects and mean student evaluation scores

Table 15

Muscular Endurance and Student Evaluation Score

Subject	Muscular Endurance	Evaluation Score
1	25	4.01
2	38	4.15
3	27	4.24
4	20	4.61
5	24	4.05
6	33	4.30
7	26	4.24
8	38	4.19
9	28	3.95
10	29	4.56
11	30	4.49
12	43	4.51
13	43	4.01
14	52	3.47
15	39	4.82
16	47	4.54
17	30	3.94
18	22	4.18
19	44	4.22
20	35	3.83
21	46	4.30
22	51	4.09
23	45	3.70
24	30	4.32
25	17	4.47

Table 16

Summary Table for Muscular Endurance and Student Evaluation Scores

Descriptive and Correlation Statistics
N = 25
dF = 23
Mean = 33.54
Standard Deviation = 11.76
R Value = -.24
Significance Level = .13

Muscular Endurance and Student Evaluation Scores		
	Modified Sit-ups	Evaluation Score
Lowest Muscular Endurance	17	4.47
Highest Muscular Endurance	52	3.47
Lowest Evaluation Score	52	3.47
Highest Evaluation Score	39	4.82

The r value of -.24 indicated lower muscular endurance correlated with higher student evaluation scores. Figure 7 illustrates the degree of relationship that exists between muscular endurance and student evaluation scores. In this study, the group that performed between 17-29 sit-ups (N=9), had an average student evaluation score of 4.26. The group that performed between 30-40 sit-ups (N=8), had an average student evaluation score of 4.38. The group that performed more than 40 sit-ups (N=8), had an average evaluation score of 4.11. Since the group that performed between 30-40 sit-ups had the highest student evaluation average for this variable, it can be concluded there was no clear trend between student evaluation scores and muscular endurance.

Percent of Fat

Percent of body fat was measured using seven skinfold sites. The sites measured were the chest, axilla, triceps, subscapulae, abdominal, suprailliac, and thigh. Lange skinfold calipers were used to gather all measurements. Percentages were calculated using a software program from Human Factors Software. The program calculates percent of fat using the Jackson-Pollock regression formula.

The mean percentage was 15.9. The standard deviation was 4.5. The range varied from a low of 7.4% to a high of 24%. When correlated to student evaluation scores, the r value was .25. The level of significance was .11. Since this value was not statistically significant, the null hypothesis of there was no relationship between

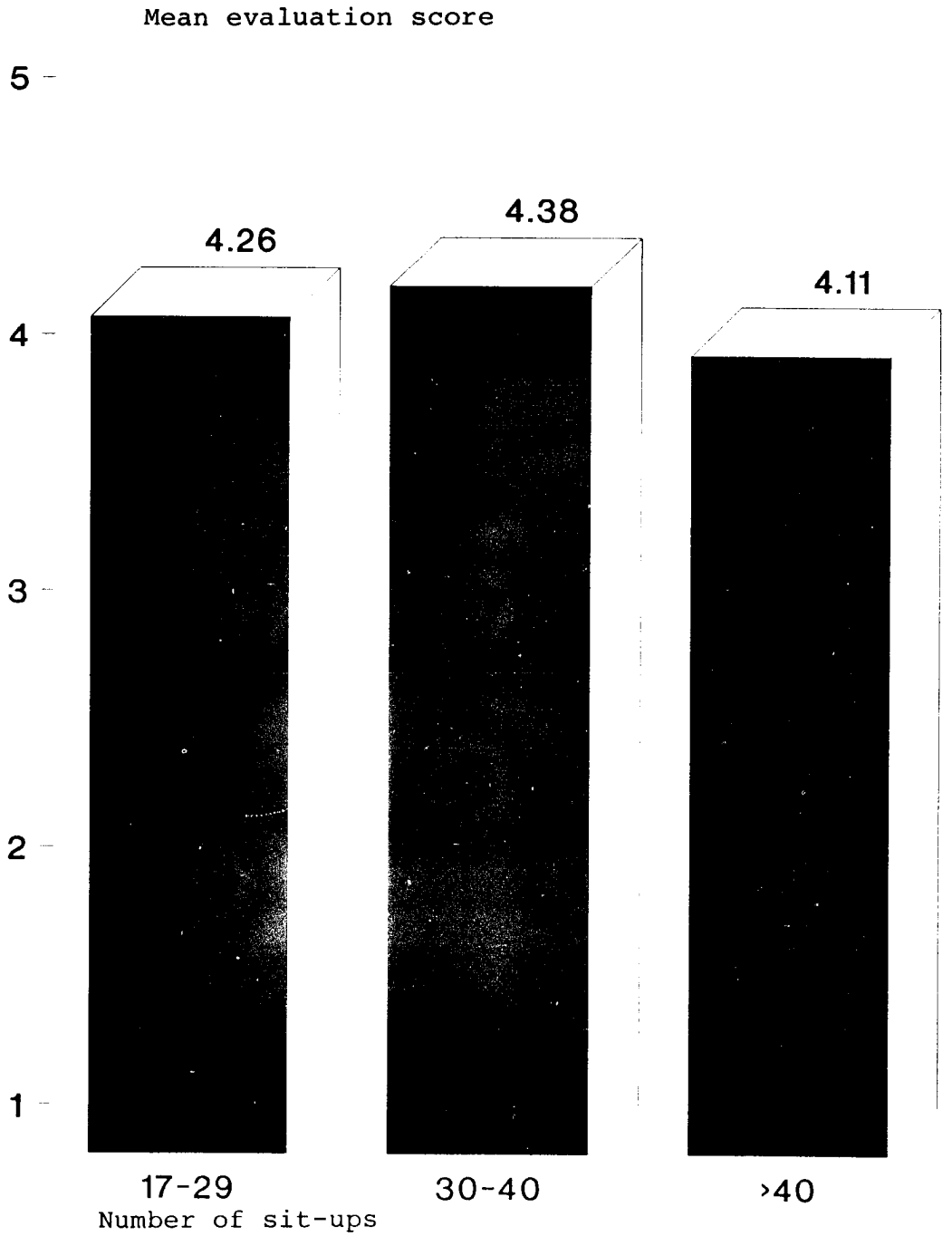

Figure 7

Muscular endurance and the mean student evaluation scores

percent of fat and student evaluation scores was accepted. Table 17 lists the subjects, their fat percentage, and student evaluation scores. Table 18 illustrates the descriptive and correlation statistics for this variable.

Although percentage of body fat was not statistically significant, there was a trend for faculty who had a higher percentage of body fat to have higher student evaluation scores. Figure 8 notes that for the group whose percentage of fat was between 7.4-10% (N=6), the average evaluation score was 4.08. The group whose percentage of fat was between 11-16% (N=8), the average evaluation score was 4.21. Lastly, the group whose percentage of fat was 17% or greater, the evaluation score was 4.28. However, it must be noted that no individual tested fell into the obese category. The fattest subject was 24% and 54 years of age. This score would be interpreted as moderate body fatness (Hoeger, 1988).

While percentages of body fat did not affect student evaluation scores in this study, it should be noted this was an interdisciplinary study. In a study performed with 850 high school students as subjects, Melville and Madalozzo found that body fatness played a role in students' evaluation of physical educators. Two videotapes were shown using the same instructor, with the same script. The difference between the two tapes was that in one tape the instructor wore a fat suit. When evaluated by the students, the instructor who wore the fat suit evaluated

Table 17

Percent of Body Fat and Student Evaluation Scores

Subject	Percent of Fat	Evaluation Score
1	23	4.01
2	17	4.15
3	14	4.24
4	24	4.61
5	22	4.05
6	18	4.30
7	21	4.24
8	10	4.19
9	10	3.95
10	18	4.56
11	16	4.49
12	19	4.51
13	10	4.01
14	10	3.47
15	16	4.82
16	7	4.54
17	16	3.94
18	15	4.18
19	16	4.22
20	17	3.83
21	18	4.30
22	14	4.09
23	15	3.70
24	10	4.32
25	21	4.47

Table 18

Summary Table of Percent of Body Fat and Student Evaluation Scores

Descriptive and Correlation Statistics
N = 25
dF = 23
Mean = 15.90%
Standard Deviation = 4.50
R Value = .25
Significance Level = .11

Percent of Body Fat and Student Evaluation		
	% of Fat	Evaluation Score
Leanest Subject	7.4%	4.54
Fattest Subject	24%	4.61
Lowest Evaluation Score	10%	3.47
Highest Evaluation Score	16%	4.82

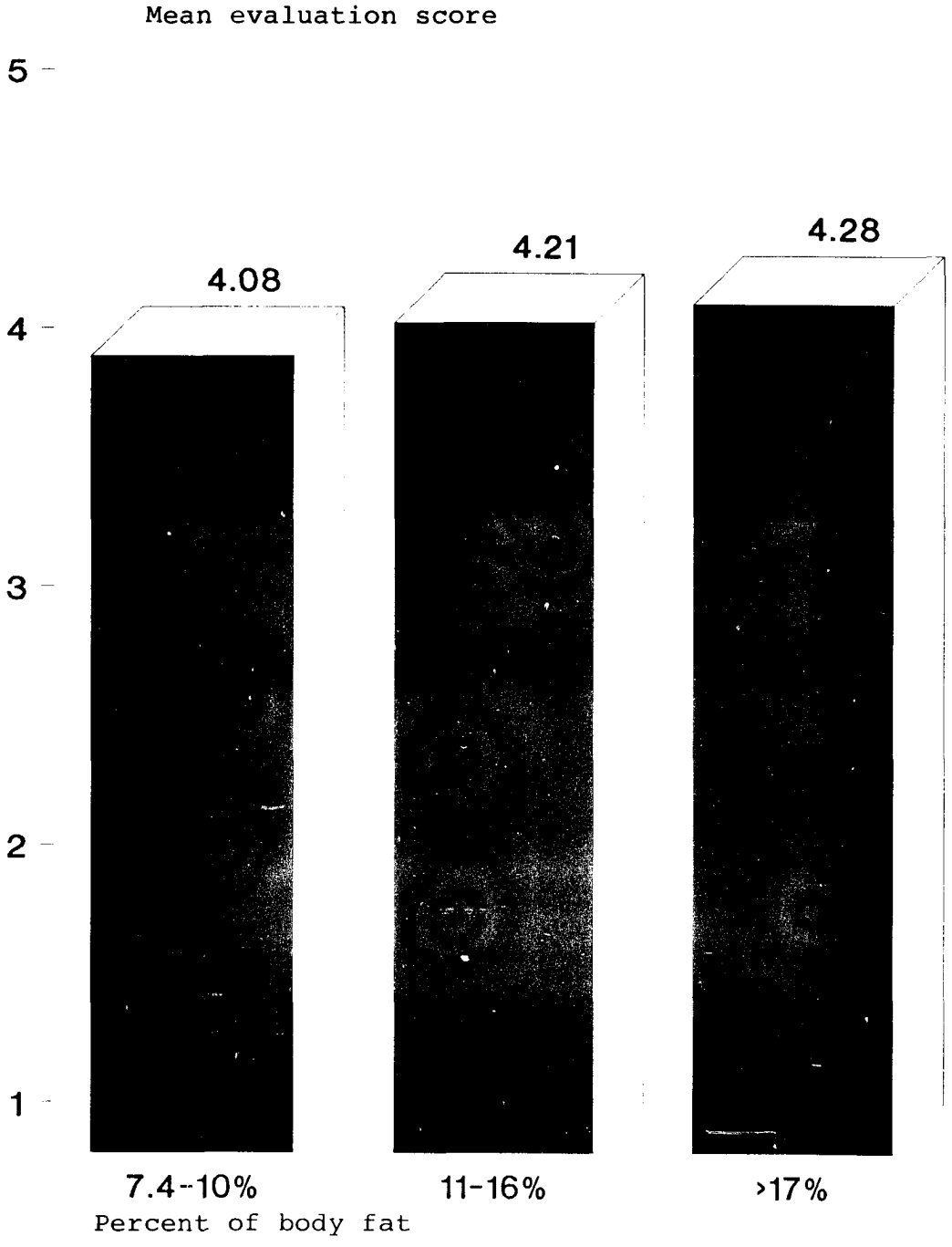

Figure 8

Percent of body fat and mean student evaluation scores

lower than the lean instructor (Melville and Madalozzo, 1988).

Oxygen Consumption

Oxygen consumption was measured using the Fox protocol. Absolute oxygen consumption was calculated in liters consumed and relative oxygen consumption was calculated in milliliters of oxygen consumed per kilogram of body mass (ml/kg).

The mean for absolute oxygen consumption was 3.519. The mean for relative oxygen consumption was 47.22. The standard deviation for absolute oxygen consumption was .464 and for relative oxygen consumption was 10.014. The range for absolute oxygen consumption ran from 2.6 to 4.39. The range for relative oxygen consumption ran from 25 to 63.

When correlated with student evaluation scores, absolute oxygen consumption had an r value of .304. The significance level was .07. This value was not significant, therefore, the null hypothesis of there was no relationship between absolute oxygen consumption and student evaluation scores was accepted.

When correlated with student evaluation scores, relative oxygen consumption had an r value of .51. The significance level was .01. Since this value was statistically significant, the null hypothesis of there was no relationship between student evaluation scores and relative oxygen consumption was rejected. It is assumed that relative oxygen consumption was significant and absolute

oxygen consumption was not because absolute oxygen consumption does not take into account body weight. Table 19 lists the subject's absolute and relative oxygen consumption along with the student evaluation scores. Table 20 lists the descriptive and correlation statistics for each variable.

When interpreted, this data illustrates that as oxygen consumption increases, student evaluation scores increased. Figure 9 illustrates the degree of relationship that exists between absolute oxygen consumption and student evaluation. Figure 10 illustrates the relationship that exists between relative oxygen consumption and student evaluation scores.

The role of oxygen consumption was extremely vital when overall fitness was taken into consideration. Cardiovascular fitness is extremely important in the efficiency of exercise (Jacobson and Kulling, 1989). Self-esteem rises when an individual feels confident and knows they will experience success in an area. Higher levels of cardiovascular fitness increases fitness levels and self-esteem, which in turn tend to increase one's productivity in life (Sonstroem and Morgan, 1989). This would be applicable to teaching also.

Stepwise Regression

A stepwise regression was performed to see which physiological variables correlated highest with each other. When performing this statistical analysis, variables which did not correlate highly are eliminated from the equation. The final variables in the equation are the ones that

Table 19

Oxygen Consumption and Student Evaluation Scores

Subject	Absolute	Weight/Kg	Relative	Evaluation Score
1	2.6	105	25	4.01
2	3.2	87	37	4.15
3	3.0	82	37	4.24
4	3.6	68	53	4.61
5	3.6	95	37	4.05
6	3.7	70	53	4.30
7	3.5	87	40	4.24
8	3.6	70	51	4.19
9	3.6	61	59	3.95
10	3.4	66	52	4.56
11	4.2	67	63	4.49
12	3.7	70	53	4.51
13	4.0	80	49	4.01
14	3.5	75	47	3.47
15	3.9	65	60	4.82
16	4.4	74	59	4.54
17	3.8	90	42	3.94
18	3.1	82	38	4.18
19	3.9	77	51	4.22
20	3.1	83	37	3.83
21	4.3	85	50	4.30
22	2.7	60	45	4.09
23	3.3	75	44	3.70
24	3.5	68	51	4.32
25	2.9	75	38	4.47

Table 20

Summary Table of Oxygen Consumption and Student Evaluation Scores

Descriptive and Correlation Statistics		
	Absolute	Relative
N	25	25
dF	23	23
Mean	3.52	47.22
Standard Deviation	.46	10.01
R Value	.30	.51
Significance Level	.07	.01

Range of Oxygen Consumption and Student Evaluation Scores			
	Absolute	Relative	Evaluation Score
Lowest Absolute Score	2.6		4.01
Highest Absolute Score	4.39		4.54
Lowest Relative Score		25	4.01
Highest Relative Score		63	4.49
Lowest Evaluation Score	3.54	47	3.47
Highest Evaluation Score	3.87	60	4.82

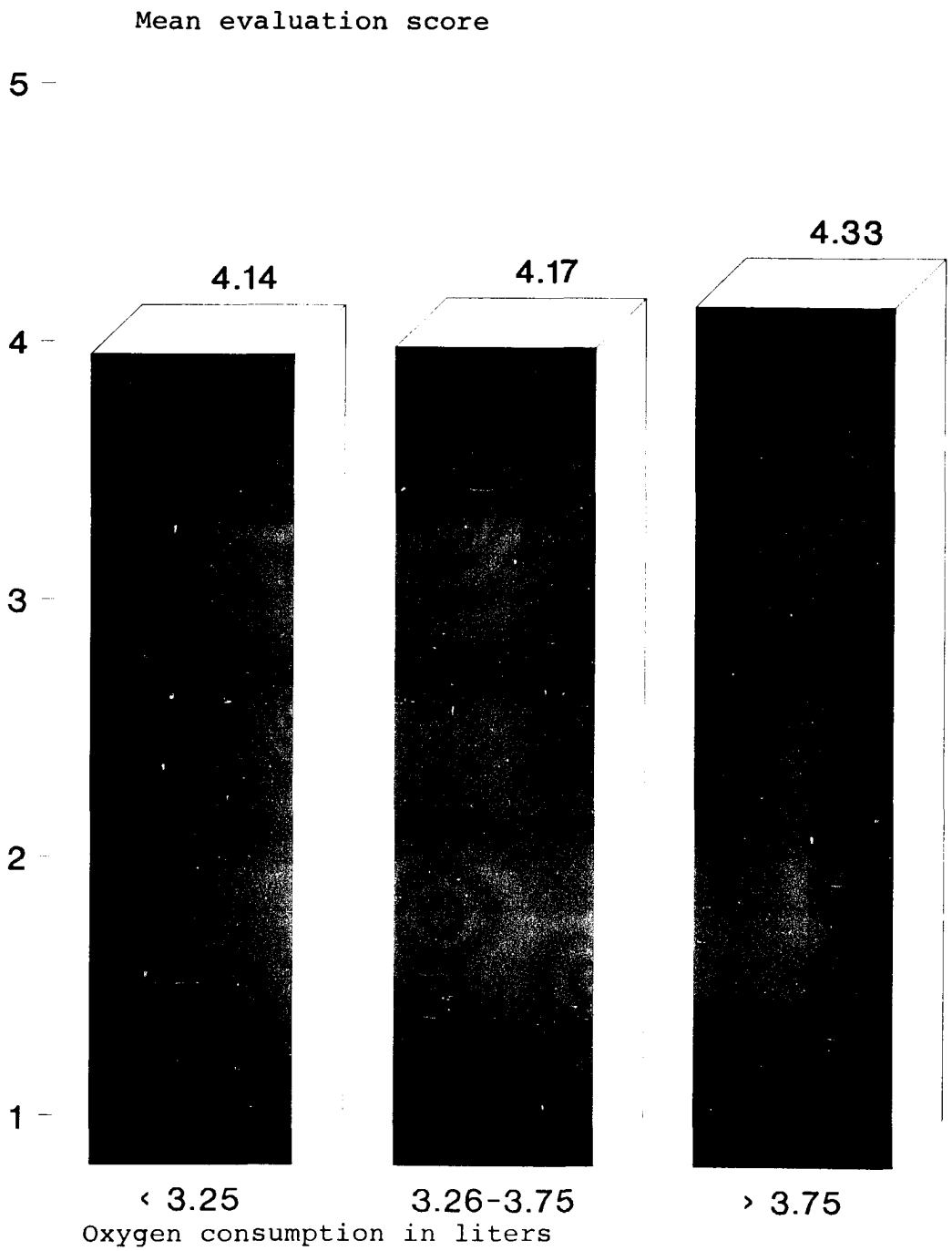

Figure 9

Absolute oxygen consumption and mean student evaluation scores

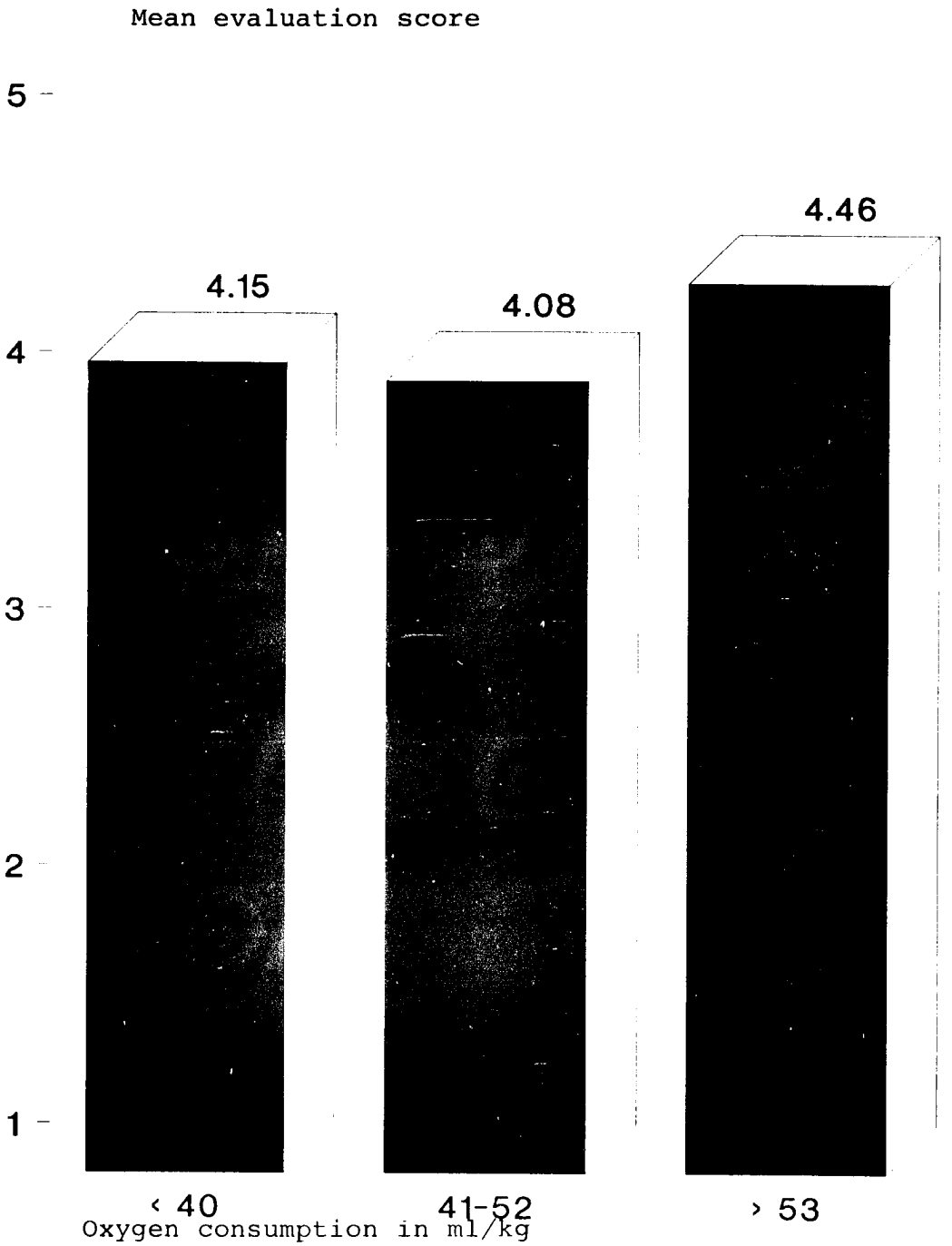

Figure 10

Relative oxygen consumption and mean student evaluation scores

correlated highest with each other. This final equation is valuable to this study because use of this information could be used to predict probable teacher effectiveness by measuring these variables.

After performing this function on SPSS, the following variables were in the final equation: diastolic blood pressure, percent of body fat, and relative oxygen consumption. By using the values of these variables, the software produced a predicted minimum and maximum student evaluation score. Table 21 illustrates the predicted scores and the relationship of these scores to actual scores.

The final equation for student evaluation was: Student Evaluation = [-.028 (diastolic blood pressure)] + [.041 (percent of body fat)] + [.016 (relative oxygen consumption)] + 4.91. The r square value for this equation was .63 with a standard error value of .2.

Table 21

Comparison of Predicted Student Evaluation Scores and Actual Student Evaluation Scores of University Faculty

Physiological Variables Used to Predict Student Evaluation Scores
Diastolic Blood Pressure
Percent of Body Fat
Relative Oxygen Consumption
Multiple R = .79
R Square = .63
Adjusted R Square = .57
Standard Error = .20

Predicted Student Evaluation Scores	
Lowest Student Evaluation Score	3.76
Highest Student Evaluation Score	4.88
Mean for Student Evaluation	4.21
Standard Deviation	.24

Actual Student Evaluation Scores	
Lowest Student Evaluation Score	3.47
Highest Student Evaluation Score	4.82
Mean for Student Evaluation	4.20
Standard Deviation	.31

Chapter 5

Summary, Conclusion, and Recommendations

Summary

Twenty-five male faculty members were tested at David Lipscomb University over the following physiological variables: age, height, resting heart rate, systolic blood pressure, diastolic blood pressure, muscular endurance, flexibility, percent of body fat, absolute oxygen consumption, and relative oxygen consumption. The data were correlated to the student evaluation scores. All statistical analyses were performed using SPSS software. The .05 level was used to determine significance. After each variable was correlated to the student evaluation score, a stepwise regression was performed to determine which physiological variables would function as the best equation to predict teacher evaluation scores.

Conclusions

Based on the data collected, the following conclusions were formed:

1. The fitness level of the male faculty who participated in the study is good. Based on norms by Dr. Ken Cooper, the mean score for all variables, except flexibility and resting heart rate, would be classified as average or above average.

2. The physiological variables height, diastolic blood pressure, and relative oxygen consumption were related to student evaluation scores.

3. Diastolic blood pressure, percent of body fat, and relative oxygen consumption are the best prediction of student evaluation scores of faculty.

Recommendations

1. More male faculty members at David Lipscomb University need to have their fitness levels measured and the results correlated to their student evaluation scores. Only 25 males participated in this study. This represents 26.3% of the 95 who were eligible. The high non-participation rate raises the possibility that a significant portion of the non-participants did not want their fitness level measured or did not want their student evaluation scores revealed to the researcher. If 25 more male faculty members could be tested and the results were similar to the findings of this study, this would add more credibility to this study.

2. A cohort study needs to be performed on the female faculty members at David Lipscomb University to see if the findings are similar.

3. Similar studies need to be performed at other educational institutions. Since teacher accountability is a current issue, if fitness levels do tend to increase a teacher's effectiveness in the classroom, this would admonish all educators to keep themselves in optimum

physical condition. However, unless school administrators make participation in such a study mandatory, or openly encourage participation, it is quite possible that participation rates in such studies will remain low.

4. Faculty members who scored low in fitness variables should be followed up and encouraged to participate in regular exercise. After adherence to an exercise program for a period of time, the faculty members should have their fitness levels reassessed and correlated to student evaluation scores. If there is an improvement in the results, these faculty members could serve as role models for improving instruction through fitness.

5. Because of an apparent lack of flexibility, steps need to be taken to inform faculty members at Lipscomb about the dangers of inflexibility. Also, faculty members should be informed on methods of improving their flexibility.

6. Even though the participation rate in the study was low, the findings of this study can be beneficial to those who are investigating the relationship between health and job performance. The results will be made known to the Lipscomb faculty by presentations at faculty meetings and sharing the information through the campus newsletter. The results will be made available to the education profession by submitting the results to periodicals for possible publication.

7. Academic administrators need to consider the health of a prospective faculty member when hiring.

Dr. James T. Arnett, Academic Dean at David Lipscomb University, was informed of the areas of significance in this study. He was then asked if he would ever let fitness levels influence his decisions of hiring faculty members. To this question he replied:

> The health and general physical fitness of any prospective faculty candidate will influence my decision to employ him/her to the extent that I am able to discern indicators of health and fitness. I do not see any immediate plans to investigate or directly evaluate fitness as part of our employment process. I can, however, imagine a time when such information is routinely required of each prospective employee.

The exact questions asked of Dr. Arnett and the text of his reply are contained in the Appendices.

APPENDICES

APPENDIX A
MALE UNIVERSITY FACULTY

UNIVERSITY FACULTY ELIGIBLE FOR STUDY

David L. Adams
Henry O. Arnold
Alfred L. Austelle
Frank L. Bennett
Craig M. Bledsoe
Ronald J. Boone
Randy E. Bouldin
George W. Boulware
Johnnie E. Breeden
Terry R. Briley
Bobby W. Brown
John H. Brown
Ralph W. Butler
Seth F. Carmody
Theodore R. Carruth
Paul L. Cates
Phillip C. Choate
Rodney E. Cloud
William Collins
John D. Conger
Marlin F. Connelly
James W. Costello
John E. Crawford
Hugh H. Daniel
Earl E. Dennis
Kenneth L. Dugan
Edward C. Edgin
G. David England
Harvey L. Floyd
Douglas A. Foster
Charles E. Frazier
Dean D. Freetly
Gerald L. Fulks
Wayne B. Garrett
Jerry L. Gaw
B. William Goree
Joe D. Gray
Larry D. Griffith
John W. Harris
Thomas H. Holland
Doy O. Holman
Dennis W. Hood
Robert E. Hooper
William C. Ingram
James L. Jackson
Kent Johnson
David O. Johnston
Norman Keener
Robert H. Kerce
Richard W. Kulp
Paul D. Langford
J. David Lawrence
Earl D. Lomax
Nathaniel Long
Dennis A. Loyd
J. Mac Lynn
Charles H. McVey
Don W. Meyer
Clyde M. Miller
Mark A. Miller
Gerald L. Moore
Douglas K. Morris
Michael C. Moss
Ralph W. Nance
Keith A. Nikolaus
Marvin A. Nikolaus
Willis C. Owens
Rolland W. Pack
Jackson W. Parham
John H. Parker
John O. Payne
Stephen T. Prewitt
Paul E. Prill
Jerome A. Reed
Stephen L. Rhodes
Coy D. Roper
Ralph E. Samples
Kenneth R. Schott
Jonathon F. Seamon
Fletcher D. Srygley
Randy A. Steger
Axel W. Swang
William A. Tallon
Dwight L. Tays
Jim L. Thomas
Edward R. Thompson
Ralph H. Thurman
Hollis E. Todd
Paul E. Turner
James E. Ward
Willis G. Wells
William E. Woodson
Eugene Wright
Oliver O. Yates

APPENDIX B

LETTER OF INVITATION

February 28, 1989

Dear Colleague:

I need your help. I would like to invite you to participate in a study that will aid you, Lipscomb, and myself.

The study is my doctoral research. It is entitled "A Study of Certain Physiological Factors and Their Relationship to the Teaching Effectiveness of College Faculty". The purpose of the study is to examine certain fitness parameters and attempt to determine if there is a relationship between the parameters and teacher effectiveness. Teacher effectiveness will be determined by using the composite scores from the faculty evaluation done in the fall semester of 1988. Missed work days due to illness and the approximate amount of money spent on you (not your family) by your health insurance company will also be used in determining teacher effectiveness.

Where I need your help is to volunteer to participate in a fitness assessment. The assessment will take approximately 30 minutes to complete. The following physiological factors will be measured during the assessment: resting heart rate, blood pressure (both resting and exercising), percent of body fat, muscular endurance, and cardiovascular endurance.

I realize your time is valuable, but I would really appreciate your participation. You will benefit from the study by learning your fitness level. Also, from the results of your assessment, I will be able to structure an exercise program to fit your individual needs, if you so desire.

Lipscomb will benefit from this study because it will be an indepth look at the fitness of the faculty. We all want to make Lipscomb a better university. Maybe we will learn from this study the importance to teaching effectiveness.

Naturally, you know how I will benefit from this study. I chose this topic because I wanted to do a study that will not only benefit me, but Lipscomb.

If you would like to participate, call me at extension 2402 and we will set up an appointment to perform the assessment. I appreciate your time and willingness to help me in my study.

Hopefully, this study will be one that will benefit all of us.

Sincerely,

Lynn Griffith

APPENDIX C

CONSENT FORM

Consent Sheet

By signing below, I give Lynn Griffith permission to use the composite score of my faculty evaluation of the spring semester, 1989, in his dissertation statistics.

_____
Signature

_____
Date

APPENDIX D

CORRECTION TABLE FOR OXYGEN CONSUMPTION

Age-Based Correction Factors for Sub-maximal Oxygen Uptake

Age	Correction Factor
25	1.00
26	.987
27	.974
28	.961
29	.948
30	.935
31	.922
32	.909
33	.896
34	.883
35	.870
36	.862
37	.854
38	.846
39	.838
40	.830
41	.820
42	.810
43	.800
44	.790
45	.780
46	.774
47	.768
48	.762
49	.756
50	.750
51	.742
52	.734
53	.726
54	.718
55	.710
56	.704
57	.698
58	.692
59	.686
60	.680

APPENDIX E

DATA COLLECTION SHEET

PHYSICAL ASSESSMENT DATA SHEET

Personal Information

Name:_____ Age:_____ Gender:_____

Height:_____ inches Weight:_____lbs. _____kgs.

Resting Blood Pressure and Heart Rate

T1_____ T2_____ T3_____ Average:_____ RHR_____

Muscular Endurance and Flexibility

One minute modified sit-ups:_____

Sit and reach test: T1_____ T2_____ T3_____ Avg._____

Percent of body fat:

Chest: _____ _____ _____ Avg._____

Axilla: _____ _____ _____ Avg._____

Triceps: _____ _____ _____ Avg._____

Subscapula: _____ _____ _____ Avg._____

Abdomen: _____ _____ _____ Avg._____

Suprailliac: _____ _____ _____ Avg._____

Thigh: _____ _____ _____ Avg._____

Bicycle Ergometer Test

HR1_____ HR2_____ HR3_____ HR4_____ HR5_____

HR6_____ R1_____ R2_____

R1_____ R2_____ Aerobic Classification:

APPENDIX F

EVALUATION AND PRESCRIPTION LETTER

November 6, 1989

Subject #17
Campus Mail

Dear Subject #17:

Thank you for participating in my dissertation study. I know you realize how valuable your participation was to me.

Below are the results of your fitness assessment:

Fitness Component	Your Score	Norm
Resting Heart Rate	87bpm	10%
Blood Pressure	132/76	53%
Muscular Endurance	22	30%
Flexibility	12.2"	35%
Percent of Body Fat	15%	87%
Oxygen Consumption	3.12 liters	47%
	Fitness Average	47%

Your general health appears to be excellent. The only areas you need to pay any special attention to are your resting heart rate and your systolic blood pressure. As we have already discussed, both these parameters will begin to improve with your participation in regular aerobic exercise.

Thanks again for participating. Enclosed is a sheet that will help you interpret the results of the assessment.

Here's to your good health.

Sincerely,

Lynn Griffith

APPENDIX G

FITNESS ASSESSMENT INTERPRETATION

Fitness Assessment Interpretation

Blood pressure - Blood pressure is divided into two phases: systole and diastole. Systole is the top number. This is the pressure exerted by the heart when the heart muscle contracts. Diastole is the bottom number. This is the pressure exerted by the heart muscle when the heart relaxes. 120/80 is considered normal pressure.

Resting heart rate - This is a measurement of the heart rate at rest. To get an accurate assessment of your resting heart rate, it needs to be taken upon waking in the morning. Lower heart rates at rest are desirable because this means the heart is not having to work as hard to supply the body parts with oxygen.

Muscular endurance - This is a measurement of your body's ability to continue strenuous exercise over a period of time. Sit-ups were chosen for this assessment because the abdominal muscles tend to be the weakest muscle group in the body. Scores from this test correlate well with total body strength.

Flexibility - Flexibility is defined as the range of motion around a joint. Specifically, the sit and reach test measures hamstring and trunk flexibility. This test was administered because its scores correlate well with total body flexibility.

Percent of fat - This is the percentage of fat in the human body. Fat accumulates on the body at sites called skin-folds. All people have fat. A smaller percentage is healthier. Also, body fatness varies with different ages and genders. The enclosed computer printout helps with interpretation of this data.

Oxygen consumption - This is a measurement of the amount of oxygen used by the body in exercise. The higher the number, the better. This means the body is efficiently using oxygen during exercise. A lower number indicates insufficient use of oxygen during exercise. The bicycle ergometer test is a submaximal test. This means your score is only a prediction of the amount of oxygen that one consumes in exercise. To obtain an accurate indication of one's oxygen consumption, a maximal test must be performed.

APPENDIX H

EVALUATION INSTRUMENT

David Lipscomb University
Faculty and Course Questionnaire

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- This form gives you the opportunity to express anonymously your views regarding the quality of instruction. Please answer the questions carefully and honestly.
- Respond by blackening the appropriate circle with a No. 2 soft lead pencil.
- On the reverse side you may want to give more detailed comments about the teacher and course.
- To help insure anonymity the teacher will designate a student to collect the forms and return them to the Dean's office. Your responses will not be seen by the instructor prior to submission of grades.

- **Use a No. 2 pencil only.**
- **Do NOT use ink, ballpoint or felt tip pen.**
- **Make dark marks that completely fill the circle.**
- **Darken one response for each statement.**
- **Erase cleanly any mark you wish to change.**
- **Do not make any stray marks.**

RATING SCALE

STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NOT APPLICABLE
①	②	③	④	⑤	Ⓝ

INSTRUCTOR

1–The teacher adequately allows for student questions and comments ①②③④⑤Ⓝ
2–The teacher shows enthusiasm ①②③④⑤Ⓝ
3–The teacher makes the course requirements clear ①②③④⑤Ⓝ
4–The teacher uses class time well ①②③④⑤Ⓝ
5–The teacher stimulates me to think about the course and subject ①②③④⑤Ⓝ
6–The teacher is consistent and fair in grading ①②③④⑤Ⓝ
7–The teacher appears competent in subject matter ①②③④⑤Ⓝ
8–The teacher presents the material in a well-organized manner ①②③④⑤Ⓝ
9–The teacher shows genuine interest in students ①②③④⑤Ⓝ
10–Feedback on exams/projects is provided in a reasonable amount of time ①②③④⑤Ⓝ
11–The teacher is available at reasonable times outside of class ①②③④⑤Ⓝ
12–The teacher makes the course interesting ①②③④⑤Ⓝ
13–The tests adequately cover the material presented in class ①②③④⑤Ⓝ
14–I would recommend this teacher to a friend ①②③④⑤Ⓝ
15–The teacher exhibits character and behavior consistent with the purposes of David Lipscomb University ①②③④⑤Ⓝ

COURSE

16–The text/readings were valuable ①②③④⑤Ⓝ
17–The projects/assignments were beneficial ①②③④⑤Ⓝ

GENERAL INFORMATION

18–What is your overall grade point average? ①②③④⑤Ⓝ
(1) [illegible] (2) [illegible] (3) 25-30 (4) 30-35 (5) 35-40

19–What grade do you expect to receive in this course? ①②③④⑤Ⓝ
(1) A (2) B [illegible] (5) F

DO NOT WRITE OUTSIDE THE BOXED AREA

Please indicate below what you liked about the teacher and the course, and also give specific suggestions for improvement.

What I liked best about the teacher and course:

What I feel could be improved about the teacher and course:

APPENDIX I

ACADEMIC DEAN'S RESPONSE TO IMPORTANCE OF STUDENT EVALUATION

January 4, 1990

To: Dr. Jim Arnett
From: Lynn Griffith
RE: Dissertation Study

In my dissertation study, the following physical variables correlated significantly with teacher evaluation scores: height, diastolic blood pressure, and oxygen consumption when measured in ml/kg. The significance of height was different from other studies because in my study, the shorter the teacher the higher the evaluation score. Literature reveals that this relationship is usually opposite. However, diastolic blood pressure and oxygen consumption are cardiovascular functions. Also, both of these variables correlated significantly to systolic blood pressure, resting heart rate, and oxygen consumption calculated in liters. This indicates there is a positive relationship between cardiovascular function and teacher evaluation scores.

With these findings in mind, would you please answer the questions below. Thank you.

1. What is the purpose of teacher evaluation at David Lipscomb University?

2. As the dean responsible for hiring faculty members, have you ever considered one's physical condition when hiring. Also, since there is a link between cardiovascular conditioning and teacher evaluation scores in this study; would you let this factor influence your decisions on hiring faculty?

Memo to: Lynn Griffith

From: James T. Arnett

Date: January 11, 1990

1. At David Lipscomb University, the formalized evaluation of faculty by their students is for the purpose of measuring the professional effectiveness of each individual instructor. Because classroom effectiveness is so highly prized in our largely undergraduate institution, this information can/will influence tenure and promotion decisions.

2. The health and general physical fitness of any prospective faculty candidate will influence my decision to employ him/her to the extent that I am able to discern indicators of health and fitness. I do not foresee any immediate plans to investigate or directly evaluate fitness as a part of our employment process. I can, however, imagine a time when such information is routinely required of each prospective employee.

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