

INFORMATION TO USERS

This reproduction was made from a copy of a document sent to us for microfilming. While the most advanced technology has been used to photograph and reproduce this document, the quality of the reproduction is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help clarify markings or notations which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure complete continuity.
2. When an image on the film is obliterated with a round black mark, it is an indication of either blurred copy because of movement during exposure, duplicate copy, or copyrighted materials that should not have been filmed. For blurred pages, a good image of the page can be found in the adjacent frame. If copyrighted materials were deleted, a target note will appear listing the pages in the adjacent frame.
3. When a map, drawing or chart, etc., is part of the material being photographed, a definite method of "sectioning" the material has been followed. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.
4. For illustrations that cannot be satisfactorily reproduced by xerographic means, photographic prints can be purchased at additional cost and inserted into your xerographic copy. These prints are available upon request from the Dissertations Customer Services Department.
5. Some pages in any document may have indistinct print. In all cases the best available copy has been filmed.

**University
Microfilms
International**

300 N. Zeeb Road
Ann Arbor, MI 48106

8523972

Thompson, Thomas McLean (Tommy)

A SURVEY OF THE PERSONAL, TECHNICAL, AND EDUCATIONAL
PHYSICAL FITNESS VALUES OF SELECTED NORTH CAROLINA PHYSICAL
EDUCATORS

Middle Tennessee State University

D.A. 1985

University
Microfilms
International 300 N. Zeeb Road, Ann Arbor, MI 48106

A Survey of the Personal, Technical, and Educational
Physical Fitness Values of Selected North
Carolina Physical Educators

Thomas McLean (Tommy) Thompson

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

June 1985

A Survey of the Personal, Technical, and Educational
Physical Fitness Values of Selected North
Carolina Physical Educators

Approved:

Graduate Committee:

Glenn P. Reeder
Major Professor

Al Solomon
Committee Member

Jack W. Peters
Committee Member

W. D. Perry
Chairman of the Department of Health, Physical Education,
Recreation, and Safety

Mary Martin
Dean of the Graduate School

ABSTRACT

A Survey of the Personal, Technical, and Educational Physical Fitness Values of Selected North Carolina Physical Educators

by Thomas McLean (Tommy) Thompson

This study was designed to provide information concerning some physical fitness/exercise habits, current technical knowledge, and extent of teaching physical fitness principles of the secondary school physical educators in the North Carolina public school system and the possible effects of these traits on the students they teach. The subjects were 36 physical educators and 384 physical education students in grades 9 through 12 who were selected at random. All geographical areas and school size classifications of North Carolina were used and an equal number of subjects were drawn from each area and classification. The mode of inquiry was cross-related questionnaires in order to make direct teacher-student comparisons. The data were descriptively-reported based on percentage analyses. Significance possibilities for statistical analyses were determined at the .05 level. Comparisons were made between male and female physical educators and between teacher and student reportings. The overall findings indicated that the majority of physical educators exercised regularly even though some did not do so long enough or intensely enough to receive physiological benefits. Weight training for personal fitness or for the students' edification appeared to have low priority as a phase of total body fitness. Current

technical knowledge of weight training procedures/principles appeared to be remiss. The students observed that physical educators used tobacco products more than they admitted. The majority of physical educators discreetly drank alcoholic beverages. Physical educators had a higher preponderance of bodyfat and lower muscularity based on their own evaluations, student evaluations, and published bodyfat-referenced literature. More male than female physical educators received better ratings from students as physical fitness practitioners, educators, and indoctrinators. The quality and quantity of physical fitness testing were suspect. The principles of warmup, stretching, and cooldown were well-established and well-executed by the educators. The physical educators were lacking in personal and student-education exercise monitoring. The current technical knowledge of physical educators concerning physical fitness terminology, weight control, diet, and body measurement was inadequate. Overall, the total physical fitness education of students in North Carolina public secondary schools as reported by the students seemed to be suspect.

Acknowledgements

To my doctoral committee--Dr. Glen Reeder, Dr. A. H. Solomon, and Dr. Jack Arters--many thanks for all their help and guidance. They are three of the most professional and caring educators I have ever met.

To my beautiful wife, Marion, for her support, intelligent input, and never-ending encouragement in my doctoral pursuit...I love you.

To the memory of Cherie and the future with Taffy.

To the memory of my mother, Margaret McLean Thompson, who would have been very proud of her son.

To my little daughter, Katherine, who wanted her daddy to be a "doctor" so he could make her well when she was sick and then she could stay home instead of going to the doctor's office and get "ugly" medicine. She never understood the difference, but is proud of her daddy nonetheless. Her little note "...my daddy is a doctor..." was a constant possession, companion, and source of determination.

To all those who believed in me.

TABLE OF CONTENTS

	Page
List of Tables.....	vi
List of Appendixes.....	vii
Chapter	
1 Introduction.....	1
Statement of the Problem.....	3
Significance of the Study.....	3
Definition of Terms.....	9
Limitations of the Study.....	9
2 Review of the Literature.....	11
Introduction.....	11
Related Studies.....	11
3 Methods and Procedures.....	16
Introduction.....	16
The Survey Instrument.....	16
Subjects.....	17
Research Sources.....	19
Pilot-Testing.....	20
Statistical Procedures.....	20
4 Analyses of the Data.....	24
General.....	24
Personal Fitness Habits of Physical Educators.....	24
Regularity of Exercise.....	24
Smoking/Tobacco Usage.....	26
Alcohol Consumption.....	26

Weight Control Habits of Physical Educators.....	27
Physique Considerations.....	27
Dieting Habits of Physical Educators.....	29
"Spot Reducing".....	29
Personal Health/Fitness Monitoring Habits of Physical Educators.....	30
Blood Pressure Monitoring.....	31
Cholesterol/Triglycerides Monitoring.....	31
Pulse Rate Monitoring.....	32
Pre- and Post-Exercise Habits of Physical Educators.....	32
Warmup Habits.....	32
Stretching/Flexibility Exercise Habits of Physical Educators.....	33
Post-Exercise Cooldown Habits of Physical Educators.....	33
Female Physical Educators' Personal Physiological Tendencies.....	34
Technical Knowledge and Instruction of Physical Educators.....	34
General Teaching Methodology.....	34
Demonstration in Class.....	34
Teacher Enthusiasm.....	34
Do Physical Educators Encourage Participation?	35
Specific Teaching Methodology.....	35
Encouraging Cardiovascular Activity.....	35
Encouraging Female Students to Weight Train.....	35
Exercise for Women's Overall Physiology..	36

Encouraging Female Activity During the Menstrual Cycle.....	36
Menstruation Education.....	37
Physical Fitness Testing Procedures.....	37
Do Physical Educators Fitness Test?.....	37
Frequency of Fitness Testing.....	37
Weight Training Instruction.....	38
Weight Training Instruction Frequency.....	38
Isotonic Versus Isometric Weight Training Principles.....	38
The RM Principle of Weight Training.....	39
Female Instruction in Weight Training.....	39
Pre/Post Exercise Instruction by Physical Educators.....	40
Warmup Instruction.....	40
Cooldown Instruction.....	40
Stretching/Flexibility Instruction.....	40
Finding Maximum Pulse Rate Instruction.....	41
General Fitness Physiology Instruction.....	41
The Four Phases of Fitness.....	41
The Three Main Parts of Exercise Sessions...	42
Cardiovascular Fitness Physiology Instruction....	42
Exercise Relationship to Heart Disease/ Attacks.....	42
Alternate Forms of Cardiovascular Exercise..	43
Maximum Oxygen Uptake (Max VO ₂).....	43
METS (Multiples of Resting Energy).....	44
Cooper's Aerobic System.....	45

Weight Control/Dieting Instruction.....	45
Best Method of Weight Control.....	45
Determining Nutritional Status.....	46
Percentage of Bodyfat.....	47
The "Sweating" Myth and Weight Control.....	48
Carbohydrates and the Exercising Body.....	48
Final Evaluations.....	49
Practicing What We Preach.....	49
General Appearance of Physical Educators.....	49
Physical Educators as Role Models.....	50
Overall Grading of Fitness Education.....	50
5 Summary, Findings, Conclusions, and Recommendations.....	52
Summary.....	52
Findings.....	53
Conclusions.....	62
Recommendations.....	63
Appendixes.....	65
Reference List.....	92
Bibliography List.....	97

LIST OF TABLES

Table		Page
1	Assignment of Educators According to School Size Classification for Purposes of Research.....	19

LIST OF APPENDIXES

Appendix		Page
A	Physical Educators' Questionnaire.....	66
B	Physical Education Students' Questionnaire.....	81

CHAPTER 1

Introduction

At one time vigorous physical activity was a daily part of most everyone's life. Automation and modern methods of transportation have greatly reduced our level of physical fitness. Our modern lifestyle has channeled both educators and students into an increasingly sedentary existence. Ironically, the human physiologies are designed for physical movement and do not adapt well to inactivity.

Many secondary school students have followed this trend and a new category of ailments related to hypokinesia (i.e., lack of exercise) may contribute to some potentially destructive habits (e.g., high-cholesterol diets, alcohol abuse, and smoking). Published studies over the past few decades have shown that people who engaged in steady physical labor or programmed exercise have far fewer physical and mental complications than sedentary, unfit people (Weider, 1984b).

Obesity is a national problem; one out of every five teenagers is grossly overweight and 11 to 28% of young adults are overweight (Stokes, Moore, Moore, & Williams, 1981). It is a common belief of students, as well as adults, to consider themselves healthy and physically fit if they are not actually suffering from an illness. In a recently reported study (Getchell, 1979), more than half of eight to twelve-year-old boys studied had at least one of the factors known to increase the risk of heart attacks in adults. These developments are serious and should be addressed by our physical educators.

Few educators would deny the importance of, and significant amount of evidence supporting, physical fitness as a positive influence on physical health. Studies have shown that exercise is good for the body and mind (Getchell, 1982). Exercise physiologists estimate (Tanny, 1985) that if secondary school students increased by 10% the amount of exercise each year after they reached puberty, they would retain youthful vigor all their lives. Research has also shown that students who have obtained high physical motor and fitness levels tend to be more extroverted, sociable, dependable, tolerant, active, and competitive; they are prone to be leaders and popular with peers (Burd & Serfustin, 1981).

It is assumed and expected, that physical education professionals should be actively involved in the education of our youth on the matters of exercise, smoking, weight control, and other key-related fitness topics. Health and physical educators are expected by many to be the most knowledgeable about the detrimental effects of obesity, tobacco use, and alcohol consumption. Many would suggest that the true value of a physical educator lies in the ability to provide students with an appreciation and understanding of the role of exercise in the relationship between fitness and health.

The writer has observed many professionally trained physical educators who have allowed themselves to become personally and professionally stagnant. They are "out-of-shape" and are often not consistent in maintaining a positive personal appearance through proper personal fitness habits. It could be suggested that these physical educators could be hard-pressed to instill in students the reasons for regular exercise.

Statement of the Problem

The purpose of this inquiry was to provide up-to-date information concerning some of the fitness/exercise characteristics, current knowledge, and extent of teaching fitness principles of secondary school physical educators in the North Carolina public school system and the possible effects of these traits on the students that they teach.

Significance of the Study

Members of the physical education profession are being placed in defensive positions in an effort to substantiate physical education goals and values (Maggard, 1984). Public opinion has suggested that physical educators need to constantly and objectively examine causes which project negative images. Teachers should reflect a constant awareness of the physical fitness values and address physical education's cognitive, psychomotor, affective, and social domains (Maggard, 1984). Many members of the physical education profession find it difficult to provide convincing supportive statements, or to reflect solid, meaningful models and experiences for students through teaching methods. Personal behavioral objectives are not always in harmony with physical education/fitness philosophies. 'As physical education teachers, we must concentrate on constructive, positive, observable student results...have my students truly benefited from my classes?' (Maggard, 1984, p. 18).

Some authors have suggested that young people are not using elders as role models. Recent research (Groves, 1984) found one out of every three children is in poor physical shape. Two recently reported studies

(Kirshenbaum, 1984) determined that of four million United States boys and girls aged six through 17 tested during the 1983-1984 school year, only 36% met "average" fitness standards. This finding represents a decline from the 43% who met such standards from 1979 through 1982. Additionally, a United States Department of Health and Human Services survey of students from the fifth through twelfth grades indicated that bodyfat measurements are significantly higher among today's youth than those in the 1960's. The study further concluded that about half of today's young people are getting appropriate physical education and/or activity. In short, American students are in feeble condition (McCallum, 1984).

"Our educational system has not been a leader in the field of physical fitness" (Groves, 1984, p. 135). "If the students are to know the value of exercise and activity, specific educational experiences must be provided to meet this objective" (Verabioff, 1978, p. 32). A report by Aspy and Roebuck (1977) found that of 1000 teachers, 90% were overweight and only 10% had an exercise routine. The authors of the report logically inferred from the data that teachers as a group were not physically fit. "Despite the importance of physical fitness as an objective of physical education programs, it is obvious our school programs are not providing sufficient activity to maintain, yet alone increase fitness levels" (Verabioff, 1978, p. 31). Only three out of one hundred American adults, including educators, participate in an organized fitness program, and, furthermore, 85% of the public do not own any type of exercise equipment (Bucher, 1974). Even though these figures have

probably increased in the last few years, it could be suggested that physical educators are falling short in one of the major objectives of their chosen profession.

Personal observations by the general public of many physical educators could lead one to believe that personal appearance is less than compatible with what we teach. Karper and Dignan (1983) made informal observations of physical educators over several years and noticed that many displayed unhealthy habits (e.g., smoking and drinking) as well as unhealthy characteristics (e.g., obesity and general "out-of-shape" physiques). "The key to teaching fitness and/or physical education, then, is for the teacher to develop a positive attitude toward physical activity" (Verabioff, 1978, p. 32).

Studies noted in the research literature (Aspy, 1977) have suggested physically fit teachers are more efficient than unfit teachers. "Physical educators who advise students to develop good health and fitness habits will probably obtain better results if they practice good health and fitness habits themselves" (Westcott, 1977, p. 15). In the same vein, persons who participate in physical fitness programs during youth are more likely to be those who exercise in adult years (Bucher, 1974). When the physical education teacher assumes the role of performance facilitator, the probability of success and self-efficacy are increased in the present and future years (Feltz & Weiss, 1982). As a physical educator, one's role would certainly seem to be development of student fitness by stimulating interest in physical activity participation (Verabioff, 1978).

Therefore, physical education teachers would seem well-advised to

make an effort to reduce undesirable behaviors (e.g., smoking) and to increase desirable ones (e.g., regular jogging). Research clearly implies that physical educators who regularly and enthusiastically participate in vigorous physical activities are more apt to encourage similar behavior on the part of students (Westcott, 1977).

The content of the physical educator's/coach's verbal statements also influences performance. Tests (Feltz & Weiss, 1982) have shown that children who hear a confident, knowledgeable model give instructions stay with tasks longer and have better performance results than children who hear an unconfident model.

Many physical educators are also coaches of the students they teach. Social researchers have noted the potential of coaches as role models to transmit values and normative expectations to the participants (Snyder, 1975). Some research (Snyder, 1975) has also shown that the physical educator/coach is often an educational advisor to players as well. Snyder (1975) states that players who are given this educational assistance by coaches are more likely to perceive coaches as positive influences.

Consequently, in light of the above discussion, an inquiry into the physical fitness habits and values of physical educators seemed warranted. Little research has been reported in this area. More insight into the topic of teacher modeling and expertise in fitness teaching of our high school physical education students appeared justified. The study could potentially discover possible educational and/or teaching shortcomings in the area of fitness education and modeling emulation. Negative carry-over value for students as they

learn and grow into adulthood could also be exposed. LaPoint (1972) found that educators who exercise during high school carry over this practice into an adult lifestyle of fitness. Brunner (1969) found that adults who exercise vigorously were high in introspection, achievement, self-image, self-esteem, and self-confidence. Still, with the obvious benefits of positive attitudes of youthful students toward physical exercise/fitness activities, very little, if any, research has explored this issue from both the students' and teachers' points of view. Karper and Dignan (1983) concluded and strongly emphasized from a related study that a great need was present to investigate and collect data concerning more exercise variables of physical educators.

This study attempted to explore the fitness considerations and values of secondary school physical education teachers. Previous research had tended to explore the fitness values of the instructors in higher education. No specific study of secondary school physical educators could be located. Consequently, this survey was an attempt to definitely isolate the physical fitness considerations and values of secondary school physical education teachers.

In addition, no study could be located that attempted to discover the professional implications of physical educators as far as modeling and its possible positive effects on students were concerned. This study attempted to examine the guidance and fitness instruction North Carolina secondary physical educators are giving students in fitness-related areas. It is one thing to be a good fitness role model, but it is perhaps even more important to adequately possess and have the ability to pass this knowledge and positive attitude on to the students.

Secondly, this study questioned the recipients of these professional implications--the physical education students themselves. A survey questionnaire was administered to a random sample of North Carolina physical education students to inquire about two areas: (1) Do physical educators present good physical education/fitness role model images and (2) Do physical educators present them with correct, usable, and current technical knowledge/application techniques?

Research has always seemed to ask the physical educators themselves how physically fit they are/were. This study attempted to ask both the physical educator and the physical education student how fit, knowledgeable, and effective are North Carolina physical educators. In the past, there could have been a research bias in effect when only physical educators were asked to evaluate their personal fitness levels/habits. It could have been that only those who exercise regularly bothered to report. In past research attempts, the students were not asked to confirm or refute the findings. Physical educators, after all, are responsible for teaching basic physical fitness to students--for educating them. This study attempted to ascertain if the student responses agreed with those of the physical educators. This approach could be significant in that the students may not perceive physical educators to be as fit and knowledgeable as they, the educators, report. The students could possibly view physical educators as less than effective teacher role models. Possibly, this procedure could be a more thorough, enlightening, and revealing study of the physical fitness activities and teaching of North Carolina physical educators.

Definition of Terms

Physical Fitness Values. This refers to the estimate which physical education teachers place upon physical fitness priorities, both personally and professionally, and how highly regarded they are by students as models for practicing and teaching usable physical fitness principles.

Exercise/Fitness Considerations. This refers to the teachers' personal exercise/fitness habits, skills, technical knowledge, and the ways these topics are positively transmitted to physical education students.

Modeling. This refers to the physical education teacher's personal physique, skills, knowledge, motivating procedures, and other mannerisms whereby the students are stimulated and imitate the teacher's demonstrated actions and/or habits.

Secondary School. Refers to junior high and senior high school.

Higher Education. Refers to related topics or persons, teachers or otherwise, at the college or university level.

Limitations of the Study

1. It was accepted that there is no one questionnaire survey which can provide information about all aspects of one's physical fitness habits, values, and considerations. Some people have a great deal of one component and very little of another, and there is no realistic way to combine all of the components into one index. The survey was based on the assumption that physical fitness is multi-dimensional.

2. The writer could not be certain the subjects' responses were accurately interpreted for data analyses.

3. The researcher was unable to match all physical educators with the physical education students they personally taught in attempts to correlate relationships (i.e., direct teacher-pupil) for purposes of statistical analyses.

It was assumed that the survey questionnaires were adequately prepared in order to gather and measure the researcher's inquires. It was also assumed that the respondents told the truth, realizing that all people have shortcomings and that perfection in human lifestyle is impossible.

CHAPTER 2

Review of the Literature

Introduction

A review of the literature revealed very little research in this area of fitness/exercise values and considerations of secondary school physical educators. Personal correspondence with the American College of Sports Medicine, Pennsylvania State University Laboratory for Human Performance Research, and The Applied Life Studies Library at the University of Illinois at Urbana-Champaign all indicated the subject was a largely unexplored area with minimal supporting research. Personal research and numerous computer searches brought forth only two semi-directly related research magnets--work by Purcell and by Karper and Dignan.

Related Studies

Purcell of Murray State University studied the state of health and fitness of members of the Kentucky Association of Health Physical Education and Recreation (1979). Purcell's study concluded that KAHPER professionals appeared to be a rather health-conscious group who put health and fitness beliefs into action. The members were found to have lower than normal blood pressure, were properly weighted, got regular vigorous exercise, and possessed above average fitness. Many were joggers and few were smokers.

The majority of Purcell's respondents were in higher education (68%)

with 32% in secondary public school education. In the category of age, 23% were in the age range 20-29 years, 34% in the 30's, 29% in the 40's, and 14% over age 50. Forty-eight percent of the respondents were male and 52% were female.

Purcell found 84% of the physical educators knew their systolic blood pressure and 87% had blood pressure monitored annually. The subjects reported whether or not they had "ideal" weight, and 93% felt they fell into this category. Almost half of the subjects (47%) had never dieted; however, females reported going on diets more frequently than males (i.e., 21% for females as compared to only 4% for males).

Purcell's survey revealed that 68% of the study group participated in vigorous physical activity of adequate duration (i.e., at least 15 minutes three or more times per week). The secondary public school physical educators (22%) were found to be less active than the higher education teachers (50%) in spite of the apparent advanced age of some of the college/university educators. Of the 56 questionnaires analyzed by Purcell, only one respondent reported a poor fitness level while none reported a very poor fitness level. However, as Purcell noted, these were self-reported values which could differ considerably from actual experimentally determined values.

Exactly half of Purcell's respondents reported they were joggers, with the college teachers more likely to be joggers (55%) than those in secondary public schools (39%). Generally the most popular distance jogged for all respondents was two miles.

Tobacco use (i.e., cigarette smokers) was 13% overall. The females (17%) were more inclined to smoke than the males (7%), Purcell noted.

Of the smokers, 71% smoked low tar and nicotine brands and 43% smoked fewer than 10 cigarettes per day. Even with the physical educators who smoked, Purcell's prevailing hypothesis was that there still appeared to be concern for health.

No reference was made in Purcell's study to the possible positive or negative effects these KAHPER members had on students. The scope of Purcell's inquiry did not appear to touch on the fitness-related motivation, class instruction, and/or exercise considerations and values in providing positive modeling for students.

Karper and Dignan (1983) gathered information on the habits of higher education physical educators relative to being overweight and/or "out-of-shape." Their subjects included a stratified random sampling of the United States. They used the questionnaire method of research and concluded from the results that the majority of men and women physical educators in higher education engaged systematically in some type of physical activity each week. Karper and Dignan, however, questioned these results based on the observations they had made at HPER meetings, clinics, and the like. They noted that a final, comprehensive research report concerning this topic would be reported in an appropriate research journal. This research could not be located or either has not yet been completed and/or published.

Karper and Dignan found that 96% of the men and 93% of the women higher education respondents stated they do something "physical" for 15 minutes at least once per week. This turned out to be anything from gardening to running to weight training. Jogging was the most popular physical activity. The subjects listed health benefits, weight control,

fun, physique and appearance, and promotion of relaxation as reasons for exercising.

Nothing in the data analysis led the authors to believe the subjects were dishonest in the replies, but, as stated, they seemed confused by the results of the study based on previous observations of a large number of seemingly out-of-shape physical educators. Karper and Dignan reported four possible explanations for this confusing discrepancy: (1) it was possible the people they observed at physical education meetings were not a true sample of the total population of university/college level physical educators; (2) the subjects may not have been engaged in sustained-strenuous exercise where large numbers of calories were being expended; (3) diet may be the major variable in being overweight and exercise participation may be just one of numerous factors which affects body weight; and (4) a questionnaire "return bias" may have been operating where nonexercisers did not respond for unexplained reasons.

Karper and Dignan cited supporting research by LaPoint (1972) and Brunner (1969) as being germane to their work. Both the LaPoint and Brunner inquiries also dealt with information on male faculty and staff at higher education institutions but not to the extent and direction explored by the Karper/Dignan study. LaPoint and Brunner judged mainly attitudes.

Reid (1976) reported physically active university teachers differed significantly from inactive teachers in fitness levels. He found physically active teachers had a more positive outlook in connection with their profession. Much like LaPoint and Brunner's work, Reid's study dealt primarily with attitudes and personality as opposed to actual,

objective fitness/exercise habits.

Reid studied 40 males from the University of Aberdeen, 20 of whom were physically active and 20 who were not. The active teachers were found to have positive feelings in hard exercise effort, deferred gratification, and consequent health and fitness benefits. The exercise group also stressed the release of frustrations and emotions.

A somewhat related research project was compiled by Loucks (1976) who studied the physical fitness habits of potential physical educators (i.e., physical education majors) at Florida State University. The stated purpose of this work was to examine and evaluate whether or not prospective physical education teachers were physically fit. He chose to ask, "Do physical education majors now practice what they will ultimately teach?" He wanted to find out if these majors made the physical fitness objective a living, daily, personal objective.

Loucks tested 146 physical education majors in two areas of fitness: muscular strength and endurance of the upper body and cardiorespiratory endurance. Analyses of the data revealed as a whole, these physical education majors were indeed fit. Surprisingly to Loucks, women were more fit than men. Sixty-three and one half percent of the females were in the superior category while only 35.7% of the males tested superior. Moreover, of the 63 women tested, only one appeared in the "poor" category, whereas nine of 84 men tested "poor." Nearly half of the majors (47.6%) were within the "excellent" category while 63% of all majors were within either the "excellent" or the "above average" categories.

CHAPTER 3

Methods and Procedures

Introduction

The research was descriptive in nature and attempted to systematically describe the findings and characteristics of the selected population. An explanation of the relationships between physical educators and students is presented in the summary section. The data collected were used to ascertain exercise/fitness values, considerations, and/or implications. No attempt was made to compare the projected population with any other group, professional or otherwise.

A number of statements concerning various fitness-related topics was prepared. The statements were related to physical fitness objectives, characteristics, lifestyle, technical knowledge, and professional application with respondents reacting to each statement.

The Survey Instrument

A questionnaire was used to gather data from both the physical educators and students. The researcher assured subjects that the results of the surveys were to be used only for statistical analyses. The researcher also instructed the subjects to answer the questions as openly and as candidly as possible.

The survey questionnaire research technique was used for several reasons. This mode of inquiry facilitated collecting large amounts of information economically and could handle data from an extremely large sampling distribution. The questionnaire appeared to be the best

method for greater accessibility to the respondents in this particular sampling. Questionnaires are usually more convenient for respondents in obtaining information directly from people (Berdie & Anderson, 1974). Familiarity with the questionnaire format could have made completion by the respondents more likely and less complex than other methods. Also the geographic considerations were not prohibitive.

The questionnaire for physical educators consisted of 55 questions (see Appendix A) while the questionnaire for physical education students had 40 possible responses (see Appendix B). Both questionnaires were appraised, approved, and validated by a panel of experts. The questionnaires were constructed in such a manner as to obtain as accurate information from the subjects as possible. Precautions (e.g., validation and field-testing) were taken to minimize the possibility of misinterpretation by the respondents. An attempt was made to explain the value and importance of the survey to each subject.

The terminology within the questionnaires was constructed in elementary, non-technical terms to extract from the respondents accurate and understandable replies. The researcher personally explained the value and importance of a properly completed questionnaire to each subject. The researcher was physically present in case any subject had questions and/or was confused.

Subjects

The subjects for this research were 36 secondary school physical educators and 384 secondary physical education students from all

geographical sections of North Carolina. The teachers and students were confined to high school grades 9-12.

For purposes of geographical sampling, a map of North Carolina was divided equally into three regions (i.e., coastal, piedmont, and mountain). Within the three regions, all size classifications of high schools (1A, 2A, 3A, and 4A) were equally sampled. This approach was taken to promote equal representation and valid sampling.

In each of the three divided geographical sections, an equal number, 18 each, of male and female physical educators was surveyed. General guidelines in research suggest a minimum of 15 cases in each gender group (Sifft, 1984). Correspondingly, these respective physical educators' physical education classes were surveyed for immediate statistical comparison. The specific locations of the randomly selected high schools were determined by a blindfolded draw. Secrecy of operation was of importance in an attempt to eliminate the students' responses from possibly being influenced by the knowledge that the class's personal physical educator was being "evaluated" when in fact the educator may have been in close proximity.

An approximately equal number of students was surveyed as to size of school (32 students in each of the respective 4A, 3A, 2A, and 1A classifications) for a total of 128 student subjects per geographical section or 384 total. Krejcie and Morgan (1970) suggest that for a population size of over 100,000 there is a requirement of 384 questionnaires needed to obtain a $.95 \pm .5$ random sample size.

The number of male and female educators was equally divided by school classification as shown below in Table 1. The parameters for

North Carolina school classifications were based on student enrollment: 1A classification was 0-300 students, 2A classification 301-625 students, 3A classification 626-1150 students, and 4A classification 1151 plus students.

A flip of a coin determined the starting point for assignment of five educators, then four, then five, etc. Nine educators represented each school size classification.

Table 1

Assignment of Educators According to School Size Classification for Purposes of Research

School Classification	Female Educators	Male Educators	Total Educators Per Classification
4A	5	4	9
3A	4	5	9
2A	5	4	9
1A	4	5	9
Total Educators Surveyed			36

Both the student and physical educator questionnaires were personally prearranged and administered and, therefore, the lack of return or lack of authenticity was eliminated. The importance of honesty was verbally exhorted by the researcher to both the students and teachers immediately prior to questionnaire-answering.

Research Sources

The subjects for the research were randomly selected from the current North Carolina Directory of Physical Educators/Coaches and a

current list of the members of the North Carolina Association of Health Physical Education Recreation Dance and Safety obtained from Fr. Al Procter, head of the North Carolina Health, Physical Education and Safety Department based in Raleigh, North Carolina. The latter publication contained the current addresses of each North Carolina physical educator.

Pilot-Testing

"The pilot test should be conducted with individuals who are very similar to the respondents of the sample" (Drew, 1980, p. 124). Therefore, physical educators and physical education students were chosen to field-test the questionnaires, and their observations, comments, and/or suggestions were analyzed and used to improve the survey questionnaire.

Space was provided for the testees to make reactions and suggest changes. Both questionnaires were pretested under conditions comparable to those anticipated in the final study. The returned test questionnaires were examined for signs such as items left blank, those yielding no useful information, misinterpretations, and ambiguities. The results were analyzed to assess the effectiveness of the trial questionnaire in yielding the information desired. Appropriate additions, deletions, and modifications to the questionnaires were made.

Statistical Procedures

The questionnaires were subjected to percentage analyses. If it were found that 14% of the respondents jog regularly, then it was reported that way. The statistical procedure/goal of this research project was

one of simplicity. No advanced, complicated mathematical and/or statistical methods were attempted to improve understanding and comprehension. Significance possibilities were derived from these percentages. Both male and female physical educator percentages comparisons are presented.

Significance of proportion formulas were used in the statistical analyses. Some areas of exercise fitness present situations where logically dichotomous variables are considered (e.g., the myth of "spot reducing") where it is assumed that the physical educators "should know better." In such physiologically accepted and/or educationally-sound instances, the use of proportions facilitated the statistical analysis of significance. Most physical educators, exercise physiologists, and the like insist on some priori proportion in determining the expected proportion. For example, 99 \pm 1 percent of college-educated physical educators should know that exercise can be beneficial to the human body. This priori proportion was judged appropriate by a panel of experts. Based on this expected proportion, a test for significance of a proportion (Bruning & Kintz, 1977, p. 221) was used in some cases and is presented below:

$$z = \frac{p - P}{\sqrt{\frac{P(1-P)}{N}}}$$

In testing for significance of difference between two proportions/percentages between female and male physical educators or physical educators and physical education students, the following significance of difference formula (Bruning & Kintz, 1977; Killian, 1984) was used:

$$z = \frac{P_1 - P_2}{\sqrt{\frac{p(1-p)}{N_1} + \frac{p(1-p)}{N_2}}}$$

where the value of "p" under the radical is computed as:

$$p = \frac{N_1P_1 + N_2P_2}{N_1 + N_2}$$

A "z" having value greater than or equal to 1.96 or less than or equal to -1.96 is considered significant at the .05 level using a two-tail test (Bruning & Kintz, 1977; Killian, 1984). A significant "z" told that the two proportions are significantly different.

The size of the student sampling statistical research values was based on the following formula for estimating sample size needed relative to the population of a known size, a specified confidence level (.95) associated with the chi square statistic for one degree of freedom, and the designated degree of accuracy as reflected by the amount of sampling error that can be tolerated (+ .05). The formula (Isaac & Michael, 1982, p. 192) is as follows:

$$S = \frac{X^2 NP (1-P)}{d^2 (N-1) + X^2 P (1-P)}$$

in which:

S = required sample size

N = the given population size

P = population proportion assumed to be .50 as this magnitude yields the maximum possible sample size required

d = the degree of accuracy as reflected by the amount of error that can be tolerated in the fluctuation of a sample proportion "p" about the population proportion "P" with the value of "D" being

.05

χ^2 = value of chi square for one degree of freedom relative to the desired level represented by entries in Krejcie and Morgan's table

The above significance formulas were used to seek simple percentage correlation. The methodology of this descriptive research project sought percentage frequencies of responses of the questionnaire items in an objective format. These significance formulas, used in conjunction with percentage totals, allowed for systematic, factual, and accurate descriptive analysis of the data. The accumulated data-based percentages were solely descriptive and did not test hypotheses or make predictions. Rather, these percentage totals and formulas described current conditions and practices in order to evaluate. The sampling size formula above assured that reliable inferences could be made.

CHAPTER 4

Analyses of the Data

General

The random sample of physical educators included 36 North Carolina secondary physical educators and 384 of their secondary physical education students. Each of the 18 male and 18 female educators was certified as a physical education teacher in grades 9 through 12. Thirty-nine percent had 15 or more years experience; 22% had 10 to 15 years experience; and 9% had 7 to 9 years experience. There were no first-year teachers.

Personal Fitness Habits of Physical Educators

Regularity of Exercise

A vast majority (89%) of the physical educators indicated they pursue personal exercise/fitness on a regular basis. Both males and females expressed equal gender participation (i.e., 89%). Non-exercisers cited two main reasons for not exercising: (1) lack of time (64%) and (2) lack of motivation (22%). Female educators cited lack of time (69%) more so than males (58%) while more male educators (25% to 19%) said they were unmotivated. No educator felt exercise was unnecessary.

The most popular forms of aerobic cardiovascular exercise engaged in by the educators were walking (18%), along with skipping rope (17%) and jogging (15%). As a group, females pursued walking, aerobic dancing, and skipping rope equally (16% each), while 30% of the males enjoyed jogging, 21% walking, and 18% skipping rope.

It was noted that 22% of the females and 33% of the males who

indicated they did pursue aerobic cardiovascular activities did not engage in the respective activities with enough intensity or duration to produce beneficial cardiovascular effects. This finding was based on Cooper's (1982) aerobic point system.

The students who had actually observed physical educators' exercise habits (41%) agreed that physical education teachers pursued cardiovascular activities. Eighty percent reported physical educators either jogged, walked, or cycled for personal fitness. Over half (59%) did not know whether the teachers pursued cardiovascular activities. The students pointed out that only 9% of physical educators did not engage in cardiovascular exercise in any form. The students implied that significantly more male physical education teachers (84%) regularly aerobically exercise than do female educators (57%).

Less than half (39%) of the combined physical educators indicated they personally lift weights as part of individual physical fitness regimens. Of the students who knew whether educators lifted weights for personal fitness, 55% pointed out teachers did exercise with resistance devices. This indicated a notable difference between what the educators reported and what the students actually viewed.

The same percentage of female educators (39%) as males regularly lift weights. The students implied that significantly more males (87%) than females (23%) lift weights on a personal basis.

The majority of the physical educators indicated that the location of the weight training equipment used most often for personal training was at school (85%). More female educators (88%) than male (82%) pointed out school use of equipment. The students reported they had observed

only 23% of female educators lift weights at school. This represents a significant discrepancy between female educator reportings and student observations.

Smoking/Tobacco Usage

Twenty percent of the physical educators noted they use some form of tobacco. More male educators (33%) than females (6%) reported tobacco use. The male educators used chewing tobacco at a higher rate (56%) than any other form, followed by cigarette smoking and smokeless tobacco use at the same rate of 22%. Female educators reported no oral tobacco use. All females who use tobacco products smoked cigarettes.

The students reported that 25% of the female physical educators and 45% of the males use tobacco products. It was noted that the students reported more tobacco use by female physical educators than the female educators intimated. Also, the students pointed out that male educators use tobacco at a higher percentage than reported by the male teachers.

Alcohol Consumption

Fifty-six percent of the physical educators report they drink some form of alcohol. Female and male educators consume alcoholic beverages at the same rate (56%) according to the survey. Beer was by far (51%) the most consumed alcoholic beverage among physical education teachers. Liquor consumption was reported at 29% with wine usage at 21%.

The majority of students (68%) did not know whether physical educators drank. The students who did intimate the drinking habits of physical education teachers cited no female educator who drank and only

4% of the males. Overall, 2% of the students suggested physical educators drink alcoholic beverages. This difference of educator-reported drinking habits (56%) and the student-reported habits of teachers appears to indicate discreet drinking by the educators.

Weight Control Habits of Physical Educators

Physique Considerations

The average age of the male physical educators was 37.27 years with the youngest being 27 years old and the oldest 70 years old. The average weight of the male physical educators was 197.44 pounds while average height was 72.58 inches or six feet one inch. The heaviest male educator weighed 310 pounds while the lightest weighed 150 pounds. The tallest male respondent was six feet six inches and the shortest was five feet nine inches. The average composite male physical educator was 37 years old, six feet one inch tall, and 197 pounds in weight.

The average age of the female physical educators sampled was 37.22 years old with the youngest being 23 years old and the oldest being 55 years old. The average weight of the female educators was 136.72 pounds while average height was 65.44 inches or five feet five inches. The heaviest female weighed 180 pounds while the lightest was 108 pounds. The tallest female teacher was six feet one-half inch and the shortest was five feet. The average composite female physical educator was 37 years old, five feet five inches tall, and 137 pounds in weight.

The majority (37%) of educators indicated possessing ectomesomorph (i.e., lean and muscular) physiques. The second largest reported classification were both endomesomorph (muscular with some rotund features) and ectomorph (lean or slim) physiques at 28% with mesomorph

(very muscular) third at 9%. There were no assessments of true endomorphs (fat and rotund).

Gender difference in educator-reported physiques was varied. More females (44%) than males (11%) reported an ectomorph physique. Many more male educators (45%) than females (28%) indicated having ectomesomorph physiques. Six percent of the female educators reported being true mesomorphs. True male mesomorphs were 11%. More males (33%) than females (22%) intimated physiques of endomesomorph while no male or female educator suggested possessing obese, endomorph physiques.

The students' assessments of physical educator physiques showed some differences of opinion. Significantly fewer students (8%) felt educators were ectomorph. Fewer students (33%) viewed educators as ectomesomorphic than the educators reported. Students felt that 13% of the educators were true mesomorphs while only 9% of the educators themselves felt they were true mesomorphs.

Students reported educators as being more endomesomorphic (41%) than perceived by the educators (28%). Seven percent of the students rated educators as true endomorphs while none of the teachers so perceived personal physiques.

It was noted that 44% of the students reported some endomorphic traits in educators' physiques. By comparison, 28% of the physical education teachers intimated some trait of fatness. This represented a significant difference of teacher-student physique perception of endomorph traits.

To further assess the physical educators' physique estimates, ideal height-weight charts based on percentage of bodyfat were used. Both male

and female physical educators were compared to ideal physique charts based on 18% bodyfat for females and 12% for males (Getchell, 1982, p. 88-89).

Based on the heights and weights reported by the educators, 56% of the female physical educators were found to have over 28% bodyfat which would place them in the "fat" or "obese" category. This represents a significant difference compared to what the female educators reported. Only 22% of the females indicated endomorph traits when asked to self-evaluate personal physiques. Fifty percent of the male teachers were found to be fat or obese when compared to the reference models, yet only 33% intimated endomorphic tendencies via self-assessment. There appeared to be a self-assessment discrepancy on the part of the educators as to what constitutes acceptable levels of bodyfat.

Dieting Habits of Physical Educators

Exactly half of the questioned physical educators indicated they are now, or have been in the past, on some form of a diet. The length of time on diets varied from a few weeks to "...constantly..." More female educators (61%) than males (39%) reported personal dieting habits. The educators collectively also reported that overall eating habits needed improvement. When asked to honestly evaluate personal eating habits, 64% indicated poor nutritional habits and need for improvement.

"Spot Reducing"

It was noted that 27% of the questioned physical educators practice the myth of "spot reducing" certain body parts. The students pointed out that 28% of physical educators have either discussed, educated, or prescribed "spot reducing" to the class or to individual students. This

finding was notable because there is no such thing as "spot reducing" (Hall, 1984; Darden, 1975; Remington et al., 1984; Darden, 1977; Stokes & Fark, 1983; Getchell, 1982; Wilmore, 1977; Katch et al., 1984a).

A related significant finding was that more female physical educators than males discuss, educate, or prescribe "spot reducing" to students. The students noted that 34% of the female physical education teachers teach "spot reducing" while 22% of the males erroneously advise students of this myth.

Personal Health/Fitness Monitoring Habits of Physical Educators

The medical profession currently recommends (Alexander, 1984) that men and women have a complete physical examination every five years until age 35. After age 35, men should have a complete physical examination annually. Women should have a uterus cancer check (i.e., a PAP's smear) every year after age 35 and a complete physical examination every five years.

Using the average age of 37 years old (i.e., the average composite age of the selected male physical educators) as a guide, only 17% of the male educators have had a complete physical examination within the last year. The highest percentage (44%) of male physical educators indicated an examination more than four years ago.

Significantly more females considered regular physical examination vital than did male physical educators. A full 56% of the female educators reported a complete physical checkup within the last year. The second highest percentage (17%) was within the last two years. By comparison, the second largest percentage of male-reported physical examinations (22%) was more than two years ago.

Blood Pressure Monitoring

High blood pressure, or hypertension, has become a major cause of death and disability. It has been identified as a major cause of strokes and heart-related problems (Stokes et al., 1981). Today, approximately 60 million adults in America, including high school students, have high blood pressure (Scott, 1984).

Thirty-six percent of the combined physical educators did not know or had forgotten current personal blood pressure levels. More male physical educators (67%) noted current personal blood pressure readings than did females (61%). More thorough analysis of the reported diastolic and systolic levels of the male physical educators noted that 17% were in the "poor" category when compared to current blood pressure norm charts for males (Cooper, 1982, p. 285).

Cholesterol/Triglycerides Monitoring

Medical researchers believe cholesterol and other blood fats (triglycerides) make up the atherosclerotic deposits on the inner linings of the arteries. High levels of cholesterol and triglycerides have been linked to increased risk of coronary heart disease (Cooper, 1977; Brooks & Fahey, 1984; Tanny, 1984b).

The vast majority (73%) of physical educators, both male and female, reported they have never had personal cholesterol/triglyceride blood checks. More male educators (34%) had had blood analysis than females (22%). Of the combined 29% of educators who have had blood checks, only 18% could be considered current or regular (i.e., within the last three years). Eleven percent of all the physical educators cited cholesterol/triglyceride checks over five years previous.

When asked if physical educators instructed the students in the regular monitoring of blood pressure, fat blood levels, and the importance of regular physical examinations as related to fitness and health assessment, 60% of the students responded that the physical education teachers had not. The students indicated 41% of the educators had instructed them in the importance of periodic physical monitoring, but ideally this 41% appears to indicate a lack of health/fitness monitoring education on the part of physical educators.

Pulse Rate Monitoring

It was found that 25% of the responding physical educators did not know personal normal resting pulse. This was a strange development indeed, seeing that all the respondent had to do was simply check the pulse while completing the questionnaire. It could be that 25% of the educators are unfamiliar with, do not know how to, or simply declined to take personal pulse rates.

The students reported that 52% of the physical educators had not educated or demonstrated pulse-taking techniques to the class. More male educators (52%) than females (44%) had illustrated or explained pulse-taking procedures to the students.

Pre- and Post-Exercise Habits of Physical Educators

Warmup Habits

The majority of physical educators surveyed agreed that warmup is important (Brooks & Fahey, 1984; Stokes & Fark, 1983; Hutchins, 1983; Wolf, 1982a; Cooper, 1977; Dayton & Goss, 1985). Eighty-one percent reported personal warmup habits before exercise sessions.

Stretching/Flexibility Exercise Habits of Physical Educators

The majority (83%) of responding physical educators confirm the importance of stretching/flexibility exercise by indicating they personally stretch before physical fitness exercise bouts. This 83% usage rate was identical for both female and male educators.

There are two types of stretching: (1) "ballistic," which involves bouncing and jerky movements, and (2) "static," which is slow, continual movement until a maximal stretch is achieved. It is advisable to avoid ballistic-type stretching and to incorporate the best type of stretch which is the static stretching technique (Stokes & Fark, 1983; Meggyesy, 1985; Baughman, Takaha, & Tellez, 1984; Burd & Serfustin, 1981; Tuten et al., 1983; Wilmore, 1977).

The surveyed physical educators show they use predominately (83%) the static-stretching method. It was noted that 17% of the physical educators either did not stretch, or did not know what type stretching method they executed.

Post-Exercise Cooldown Habits of Physical Educators

It is highly recommended that the exerciser come out of workouts gradually and smoothly and let the body return to its normal state at a moderate rate. In other words, keep moving. A thorough cooldown series is an indispensable part of an exercise regimen (Mayo & Mayo, 1984; Brooks & Fahey, 1984; Cooper, 1977).

Physical educators apparently agree as 72% intimate incorporating a cooldown period into personal exercise patterns. Significantly more female physical educators (83%) view cooldown with greater emphasis than males (61%) even though clearly the majority of physical educators

indicate belief in, and practice of, the benefits of cooldown.

Female Physical Educators' Personal Physiological Tendencies

Female physical educators, because of physiological design, have unique physical fitness exercising concerns--the menstruation cycle and related problems. The majority (76%) of the female teachers noted no personal menstruation problems. Of the 24% who did report discomfort, 50% reported dysmenorrhea (i.e., painful, cramping periods) as the most common complaint. Irregular cycles and amenorrhea (i.e., absence of the monthly cycle) were problems, each cited by 25% of female educators.

When these same physical educators were asked if they felt exercise helps dysmenorrhea, a full 100% signified it could, and in fact did, help this painful occurrence. Also, 100% indicated they continued to exercise normally during menstruation periods.

These reportings are supported by physiological literature. The general consensus is that exercise is not harmful to the menstruating woman and she can continue to exercise regularly during menstruation (Liefer, 1983; Tuten, 1983; Brooks & Fahey, 1984; Getchell, 1982).

Technical Knowledge and Instruction of Physical Educators

General Teaching Methodology

Demonstration in Class

The students surveyed report that 81% of physical educators demonstrate activities in class. According to students, more male teachers (82%) than female (79%) demonstrate activities in class. The indication that nearly 20% of physical educators do not demonstrate physical activities is noteworthy.

Teacher Enthusiasm

According to students, 77% of physical educators are enthusiastic when teaching physical education class. More males (80%) than females (73%) were rated enthusiastic. Many would suggest that if 23% of the educators are unmotivating and nonenthusiastic that this could certainly be educationally noteworthy.

Do Physical Educators Encourage Participation?

Participation in physical activity is not valued by most members of our society (Burd & Serfustin, 1981) even though opportunities and facilities have improved so very much. Technology has made exercise attractive, practical, and available. Perhaps what is missing is encouragement and/or motivation.

The students reported that both female (84%) and male (80%) physical educators encourage participation in physical fitness/exercise/physical education activities. Combined, 82% of the educators encouraged physical participation in and out of the classroom.

Specific Teaching Methodology

Encouraging Cardiovascular Activity

The students related that 72% of physical educators encouraged cardiovascular-type fitness exercise. More male teachers (75%) than females (69%) were noted as being encouragers in this aerobic area.

Encouraging Female Students to Weight Train

The surveyed educators reported that 81% recommended weight training for female students. However, the students reported a significant difference, citing only 26% of the teachers having recommended weight training to females. Additionally, even though 81% of the educators said they recommended weight training for female students, a lesser amount

(72%) believed current research literature that females can gain just as much from weight training as males (Burd & Serfustin, 1981; Dayton & Goss, 1985; Darden, 1977; Tuten et al., 1983; Westcott, 1982; Getchell, 1982; Dunn, 1985; Wilmore, 1977). More female teachers (89%) recommended weight training for female students than did males. Significantly, 20% of the surveyed educators did not know whether weight training was just as beneficial to women as men.

Exercise for Women's Overall Physiology

All the questioned physical educators answered that they felt exercise in any form was good for a woman's physiology. This finding held true for both male and female educators.

Encouraging Female Activity During the Menstrual Cycle

When the physical educators were asked if they encourage or demand female students to continue physical education during menstruation, 100% indicated they did. Brooks (1984) reports that menstrual problems appear to be less common among women physical education students than those who are physically inactive. The bulk of evidence (Tuten et al., 1983; Getchell, 1982) suggests that physical participation should be allowed, and demanded, of physical education female students during menstruation, and additionally, that menstruation is generally not adversely affected by exercise.

The students reported a significant discrepancy as they related that 60% of physical educators do in fact excuse them from physical education class during menstruation. Additionally, significantly more males (73%) excuse female students than do female teachers (47%).

Menstruation Education

When asked if physical educators had ever taught the class about the effects regular exercise has on menstruation and the female body, 56% reported that no such instruction had been forthcoming during any and all physical education or health classes. This 44% instruction rate appears educationally significant in light of the 100% affirmation of physical educators' reported beliefs on menstruation. Additionally, significantly more male teachers (55%) had explained the exercise-menstruation relationship than female educators (34%).

Physical Fitness Testing Procedures

Do Physical Educators Fitness Test?

Easily administered field tests have been devised and are readily available to all physical educators. These field tests correlate well in measuring fitness levels of students, regardless of age or sex.

The majority (83%) of polled physical educators point out student testing to assess present fitness levels. However, the students reported only 62% of the educators had conducted physical fitness measures. More male educators (94%) reported fitness testing than female teachers (72%). The students concurred that more male educators (74%) test than female teachers (50%).

Frequency of Fitness Testing

Fifty-two percent of the physical educators indicated pre- and post-fitness testing. The remaining 48% tested either once a year, once a semester, or checked the "other" category.

Some authorities (Cooper, 1982; Katch & Katch, 1984c) recommend constant, periodic testing to make sure frequency, intensity, and volume

of exercise are adequate for the desired results. Based on the recommended guidelines of much current exercise and fitness literature, it appeared that too many physical educators (48%) are not pre- and post-testing for student fitness improvement/regression.

Weight Training Instruction

Weight Training Instruction Frequency

Fifty-eight percent of the physical educators have never had a unit lesson plan on weight training for fitness. The students also reported that significantly more male instructors (61%) than female (24%) had a section on weight training incorporated into yearly lesson plans. This finding was also relevant in that 100% of the schools surveyed had weight training equipment available.

Isometric Versus Isotonic Weight Training Principles

In reality, isometric weight training has not been practiced in any observed weight room, school, or laboratory for more than 20 years. Yet 11% of the surveyed physical educators felt isometric weight training was not only the best method, but actually prescribed this weight training procedure to students or athletes. Forty-two percent of the teachers held that isotonic was the superior method (Brooks & Fahey, 1984; Burd & Serfustin, 1981; Getchell, 1979; Wilmore, 1977; Delisa & DeLateur, 1983; Getchell, 1982) while 6% indicated either method (i.e., isometric or isotonic) was acceptable. Thirty-nine percent of the instructors cited they did not know which method was best and 53% of the surveyed educators were either unfamiliar with, or prescribed isometric techniques of weight training to students or athletes. More female educators (56%) than male (22%) indicated they did not know which weight training principle/

technique was superior. More male teachers (50%) than female educators (33%) though isotonic was the superior method.

The students intimated that 88% of the physical educators had not explained or educated them concerning isometric versus isotonic weight training principles. The students also pointed out that of the 12% of instructors who had discussed these principles, significantly more male teachers (16%) than female (8%) had done so.

The RM Principle of Weight Training

The basic weight training term (Getchell, 1979) 'RM' refers to repetitions maximum which is the maximum load that can be lifted a given number of times (e.g., '10 RM' means the greatest weight that can be lifted 10 times for a given exercise). Twenty-eight percent of the polled educators were not familiar with the RM principle of weight training while another 28% did not use the principle even though they indicated they were familiar with it. The gender usage of the RM principle was equal (44%). Combined, more than half (56%) instruct weight training classes via the RM principle.

The students surveyed indicated only 12% of the educators had explained or used the RM principle. This represented a significant discrepancy between what the educators reported and the students reported. Also, the students pointed out that significantly more male teachers (16%) than female (8%) had explained the RM principle.

Female Instruction in Weight Training

The students reported only 26% of the physical educators had educated them concerning the fact that females can possibly benefit as much or more from weight training than males. More male educators (27%)

than females (24%) had gone over this physiological reality with students. Considering the documented and accepted importance of weight training benefits to females, this finding was significant. Remembering that 72% of the combined physical educators reporting indicated they did indeed recommend weight training for female students or athletes, this was another significant discrepancy between teacher recommendations and actual student instruction.

Pre/Post Exercise Instruction by Physical Educators

Warmup Instruction

The students cited that 72% of the physical educators had educated them in warmup procedures. Both male (71%) and female (72%) teachers had presented this instruction. Conversely, 81% of the physical educators reported they personally include warmup sessions into exercise regimens.

Cooldown Instruction

Again, 72% of the female teachers and 71% of the male educators had presented cooldown principles to the students. As previously noted, 72% of the combined physical educators personally practice cooldown after exercise.

Stretching/Flexibility Instruction

The students indicated that 91% of the physical educators had explained or demonstrated stretching/flexibility exercises and the related importance of such procedures. More male educators (95%) than female (87%) had discussed this phase of exercise to students.

As for the type of stretching (i.e., static versus ballistic) discussed previously, the students intimated that just over half (55%) of the teachers advocated slow, static stretching over ballistic-type

flexibility exercises. This is significant in light of the published research literature that exposes the superiority of static-type stretching over ballistic stretching.

Finding Maximum Pulse Rate Instruction

A person's maximum heart rate is the number of beats the heart makes per minute when the body is undergoing maximum exertion. It is the point at which the heart rate plateaus with increased exercise.

A quarter (25%) of the physical educators surveyed did not know how to find maximum pulse for fitness-related activities. In addition, the students reported that less than half (48%) of the teachers had educated, discussed, or demonstrated pulse-taking procedures. Considering the importance of fitness exercise monitoring, this finding was noteworthy. More male teachers (52%) than female (44%) had gone over pulse-monitoring.

General Fitness Physiology Instruction

The Four Phases of Fitness

Most fitness/exercise authorities (Darden, 1977; Wolf, 1982a; Getchell, 1982; Stokes & Fark, 1983) agree that total physical fitness requires a comprehensive and intelligent program of four basic areas: (1) cardiovascular, (2) muscular strength and endurance, (3) flexibility, and (4) body composition/percentage of bodyfat analysis.

Only 8% of the physical educators felt all four areas of fitness were equally important. The majority of educators (55%) felt heart/lung fitness was the most important, with flexibility second (20%), muscular strength and endurance third (11%), and proper body composition fourth (7%). Male and female educators both agreed cardiovascular was

most important with flexibility second. The males believed muscular strength/endurance was third in importance while females placed body composition third. Male teachers felt body composition was least important while the females considered muscular strength/endurance least important. Significantly more female educators (13%) than male (3%) felt all four phases of fitness were equally essential.

The students reported 56% of the educators had educated them about the four areas of fitness. An equal percentage of male and female teachers (44%) had not gone over the four fitness areas with students.

The Three Main Parts of Exercise Sessions

The surveyed physical educators were asked if they agreed with current exercise/fitness literature (Getchell, 1982; Stokes & Fark, 1983; Brooks & Fahey, 1984) which states a comprehensive exercise session should consist of three segments: (1) warmup, (2) the main workout, and (3) cooldown. The majority (77%) of teachers agreed. Of the educators who did not, 12% thought the main workout was most critical, 9% felt warmup was the most important phase, and 3% believed the cooldown phase was most important. More female physical educators (88%) than male teachers (65%) felt all three phases were equally important.

The students reported that combined, 66% of the educators had discussed the relationship/importance of the three phases of exercise sessions. Significantly more male teachers (73%) than females (59%) had presented this information to physical education classes.

Cardiovascular Fitness Physiology Instruction

Exercise Relationship to Heart Disease/Attacks

Ninety-five percent of the physical educators questioned felt

exercise can prevent heart problems. All the female educators felt this way while the male educators (89%) were a bit more reserved.

However, only 52% of the physical educators, according to the students, had suggested or explained the fitness-versus-heart attack correlation. It was significant that 48% of the educators, in light of reported personal views, had not at least told physical education/health classes about the possibly strong relationship between the effects of exercise on heart attack/disease. Slightly more male educators (52%) than female (51%) had mentioned this risk factor to the students.

Alternate Forms of Cardiovascular Exercise

As previously noted, the students related that 72% of the physical educators encouraged cardiovascular-type exercise. The most common forms of cardiovascular exercise are jogging, walking, and cycling. However, alternate forms of aerobic-type cardiovascular exercises (e.g., aerobic dancing, stationary cycling, rowing) are available to persons/students who, for one reason or another, do not wish to pursue common forms of cardiorespiratory exercise.

The students stated that 63% of the educators had presented alternate forms of aerobic cardiovascular exercise to the class. More female educators (66%) than males (60%) had presented this information.

Maximum Oxygen Uptake (Max VO₂)

Maximum oxygen uptake, or Max VO₂, is a measure of maximal heart/lung function. It represents the largest amount of oxygen one can consume per minute. This measure of the capacity, power, and efficiency of the aerobic or oxygen system is a functional measure of one's physical

fitness.

Considering that 89% of the physical educators reported they exercise regularly, only 3% of the combined educators knew personal Max VO₂ levels. No female educator knew this measure while 6% of the male teachers had personal knowledge of self-Max VO₂ measurements.

The students indicated that 3% of the combined educators had educated or explained Max VO₂ in class. No female educator had mentioned this measurement to the students while 5% of the male educators had mentioned the measurement.

METS

A "MET" is a term used universally by exercise leaders to represent the energy cost value at rest. It is an acronym for "Multiples of Resting Energy" requirement. METS correspond with maximum oxygen uptake. It is a simplified system for classifying physical activities that has been developed using the concept of metabolic equivalents. Many aerobic authorities (e.g., Kenneth Cooper, Dave Costill, Bud Getchell, Frank and Victor Katch) include this basic term in exercise intensity literature. Basic knowledge of the term METS appears warranted for prescribing fitness/exercise programs.

Ninety-four percent of the surveyed physical educators were unfamiliar with the term METS. Of the 6% who were, both male and female educators were equally (6%) accustomed to the acronym. However, the students reported that 8% of the educators had explained METS. The students additionally reported that slightly more female educators (8%) than male (7%) had discussed METS in some capacity.

Cooper's Aerobic System

The word "aerobics" refers to a variety of exercises (e.g., jogging, walking, cycling, swimming) that stimulates heart and lung activity for a time period sufficient to produce beneficial changes in the body. Many colleges, universities, and high schools throughout the country have adopted aerobics as a part of physical education programs.

Less than half (45%) of the physical educators surveyed were familiar with Cooper's aerobic system. Female educators were more familiar with the program (50%) than were the male teachers (39%). Considering the vast impact of Cooper's program, usage, potential, or practicability, these findings were notable.

The students reported only 1% of the combined educators had presented Cooper's program to physical education classes. According to the students, more males (2%) than female (0%) educators had mentioned or use Cooper's aerobic system in related fitness activities.

Weight Control/Dieting Instruction

Best Method of Weight Control

Permanent weight control is most effectively achieved through a combined program of sound nutrition and regular exercise (Darden, 1977; Burd & Serfustin, 1981; Wilmore, 1982; Cooper, 1982; Getchell, 1982; Stokes & Fark, 1983; Mirkin, 1983; Remington, Fisher, & Parent, 1983; Vash, 1984; Brooks & Fahey, 1984; Katch & Katch, 1984b & 1984c; Tanny, 1985 & 1984c; Wolf, 1982b). Regular exercise and sound nutritional habits go hand in hand.

Fifteen percent of the combined physical educators did not know the best method of weight control. More male (18%) than female (11%)

teachers were unfamiliar with proper exercise/diet relationships for sound weight control.

Less than half (46%) of the educators felt both exercise and diet were the best method of nutritional health. Significantly more female educators (67%) than male (24%) felt both exercise and diet were necessary for intelligent weight control.

Five percent of the males and no female instructors felt dieting alone was the key to weight loss. Significantly more male teachers (53%) than female (22%) felt exercise alone was the key. The indication that 54% of the physical educators surveyed do not know that both proper exercise and diet are necessary for weight control was considered significant.

The students reported that 60% of the total educators had explained the best methods of weight control. They indicated slightly more female teachers (61%) than male teachers (59%) had covered this nutritional principle.

Determining Nutritional Status

Standard insurance company height/weight/age charts often consider many conditioned people "overweight." Exercise authorities suggest it is unfortunate that insurance company height/weight/age charts have become an accepted and integral basis for nutrition and weight control programs (Getchell, 1979; Katch & Katch, 1984b; Stokes et al., 1981; Brooks & Fahey, 1984). These tables do not consider the percentage of bodyfat and therefore can be very misleading (Stokes & Fark, 1983). Bodyfat, not bodyweight, is the key factor.

A quarter (25%) of the physical educators surveyed believed the best

method of determining nutritional status was height/weight/age charts. Decidedly more male educators (32%) than female (17%) indicated height/weight/age chart preference. Combined, 7% of the educators responding did not know better methods of determining proper body composition. Fourteen percent of the male teachers did not know.

Percentage of Bodyfat

A most reliable nutritional fitness measurement is percentage of bodyfat. This measurement can be administered by various techniques but perhaps the most practical for most high school physical educators is skinfold calipers.

Overall, 44% of the surveyed physical educators felt the use of skinfold calipers was the most practical, useful, and affordable method of determining student bodyfat composition. Fifty-six percent of the physical educators, both male and female, preferred techniques other than skinfold calipers (e.g., height/weight/age charts, girth measurements). More female teachers (52%) than male (36%) considered calipers the best method.

Exactly half of the polled educators had never had personal percentage of bodyfat measured. Kirkendall (1981) indicates the average percentage of bodyfat for the American male younger than 30 years old is 20%. The average for over-30 males is 25%. Females under age 30 average 25% while over-age 30 females average 31%. Translated, this means the average American post-puberty adult is overfat and undermuscle.

Of the physical educators who indicated having had personal percentage of bodyfat checked, 78% of the male educators and 67% of the females did not remember personal percentage of bodyfat levels.

Significantly, 74% of the physical educators had never measured physical education students' bodyfat levels.

The students reported that 26% of the physical educators had measured class percentage of bodyfat in some manner. They indicated that 48% of the combined educators used height/weight/age charts. Calipers were used by 6% of the teachers while girth measurements were preferred by 1% of the educators.

Significantly more female educators (8%) than male teachers (3%) used calipers. Significantly more male instructors (58%) than female educators (38%) used height/weight/age charts according to student responses.

The "Sweating" Myth and Weight Control

Twenty-one percent of the male educators and 13% of females indicated that to induce sweating to lose weight, they have worn a plastic belt or rubber suit or have sat in a sauna. According to surveyed students, 22% of all physical educators had educated, explained, or told them about wearing apparatus to "sweat off" weight.

Fat cannot be "sweated off" and dehydration is not only useless for weight control but can be dangerous (Getchell, 1982; Tuten et al., 1983; Stokes & Fark, 1983; Remington et al., 1984). Significantly more male physical educators (26%) than female (17%) advocated "sweating" weight loss to students.

Carbohydrates and the Exercising Body

The physical educators were asked the most important food group for active, exercising athletes or students. The majority (68%) agreed with current research that recognizes carbohydrates as the best fuel for the

exercising body (Getchell, 1982; Darden, 1983; Stokes & Fark, 1983; Tanny, 1984a; Katch & Katch, 1984c; Brooks & Fahey, 1984; Zucker, 1985).

Twenty-nine percent of the total physical educators questioned felt protein was the most important food group to the exercising body. None of the physical educators surveyed felt fat was important to the exercising body. Behind carbohydrates, fat is the preferred food for the exercising body (Katch & Katch, 1984c; Darden, 1983; Tanny, 1984a; Stokes & Fark, 1983). More males (36%) than females (22%) listed protein as the most important food group of the three. More females (72%) than males (64%) answered that carbohydrates were the key energy source for active bodies.

Sixty percent of the students indicated physical educators had explained the importance of carbohydrates to exercise. A few more female teachers (60%) than male (59%) had gone over this food group with the physical education classes.

Final Evaluations

Practicing What We Preach

The teacher who practices what is preached will win the students' respect and enable the students to gain self-confidence (Feltz & Weiss, 1982). Sixty-two percent of the questioned physical education students believed physical education teachers practice what they preach. The students felt more males (69%) than female (54%) practice what they preach. Significantly, almost half (46%) of the female educators do not, according to students, practice fitness preachings.

General Appearance of Physical Educators

The students were asked to assess the overall general appearance of

physical educators. Fifty-nine percent of the students answered good, 38% checked fair, and only 4% felt teachers' general appearance was poor. More male teachers (67%) than females (50%) were described as good. More female physical educators (5%) than males (3%) were classified as having poor general appearance.

Physical Educators as Role Models

To help insure acceptance and implementation of physical fitness/exercise programs, physical educators should be good role models for students. Teaching by example is often referred to as modeling. Modeling "...is considered an effective means by which students learn a variety of skills and behaviors" (Feltz & Weiss, 1982, p. 25).

Seventy-four percent of the students polled perceived physical educators as good role models. Male educators (80%) were seen as being better role models than females (67%) by the students.

Overall Grading of Fitness Education

The students were asked to grade the fitness education obtained in high school physical education classes which could be useful as they progress into adult life. Students generally are aware of the necessity of physical fitness, but often fail to realize the importance of increasing personal physical efficiency to meet the demands of everyday living as they grow into adulthood. Consequently, it becomes one of the most important tasks of high school physical education to give students an understanding of the nature of physical fitness and to impress upon them the health benefits of physical fitness activities (Vannier & Fait, 1975; Stokes & Fark, 1983; Vash, 1984; Brooks & Fahey, 1984; Hatfield, 1983).

Fifty-three percent of the students rated high school fitness education average and below. Thirty-two percent of the students felt overall fitness education was good while 17% checked excellent. Significantly more male teachers (21%) than females (13%) were judged excellent. Overall, female physical educators were rated average and below by 58% of the students while males were overall rated average and below by 45% of the students. Three percent of the students indicated they received no fitness training while in high school; 4% poor; and 16% fair. More female teachers (24%) were in the poor, fair, and no-training categories than were males (19%). Forty-nine percent of the students felt they received good and excellent overall fitness education in high school physical education classes.

CHAPTER 5

Summary, Findings, Conclusions, and Recommendations

The purpose of this study was to ascertain the current personal exercise/fitness values, considerations, teaching practices, and technical knowledge of randomly selected secondary school physical educators in the North Carolina Public School System and the possible implications thereof toward the positive teaching of students. The mode of inquiry was physical educator and student questionnaires and the reporting was descriptive in nature.

Summary

The subjects used in this study were 36 (18 male and 18 female) randomly selected high school physical educators representing the three geographical regions of North Carolina and each enrollment size classification. The 384 student subjects also represented each school size and geographical location. Every effort was made to match the randomly selected physical educators with the corresponding students they had or were teaching in order to make direct teacher-student comparisons.

An equal number of male and female educators was surveyed. The students were selected at random with no regard to gender.

Percentage analysis was the mode of statistical reporting. Significance possibilities were derived from percentage comparisons. Comparisons were made between male and female physical educators and between teacher responses and student responses.

Findings

For final condensation, the following five sections were designated: (1) Personal Exercise/Fitness Habits and Physiques of Physical Educators, (2) Classroom Instruction and Management, (3) Physical Educators Current Technical Knowledge of Fitness, (4) Personal Fitness Monitoring Habits of Physical Educators, and (5) Female Educators' and Students' Special Physiological Concerns. Based on the information provided by the physical education teachers and students and related literature, the following findings were revealed:

Personal Exercise Habits and Physiques of Physical Educators

1. The majority of North Carolina secondary school physical educators appeared to exercise regularly. However, the data implied a quarter of them did not engage in exercise long enough or intensely enough to receive beneficial physiological results.
2. According to student observations, significantly more male physical educators aerobically exercised at school or in view of students than did females.
3. Fewer than half of all physical educators weight-trained for personal fitness.
4. Just as many female physical educators as male physical educators weight-trained for personal fitness.
5. More male physical educators weight-trained in view of students and/or within the school environment than did females. More female than male educators reported use of school weight training equipment.
6. Significantly more physical educators, both male and female, reported they used the school's weight training equipment than were

actually observed by the students.

7. A greater percentage of male physical educators reported using tobacco products than females.

8. Oral tobacco was the principal form of tobacco used by male physical educators.

9. Female physical educators who used tobacco all smoked cigarettes and none used oral tobacco.

10. The students reported that both male and female physical educators used tobacco products to a greater extent than the educators reported.

11. A preponderance of all physical educators drank alcoholic beverages in one form or another, yet they apparently did so discreetly and out of view of students.

12. The majority of physical educators indicated their personal physique classification to be lean and muscular, while the students reported observing significantly more overfat teacher physiques. Students reported almost half of the physical educators had some endomorphic characteristic while 28% of the teachers described themselves as endomorphic. It appeared that many physical educators had higher opinions of their personal physiques than did the students.

13. Both male and female physical educators' perceptions of personal muscularity levels differed significantly from muscularity levels determined by the researcher's comparison of reported height/weight levels against published ideal bodyfat, muscularity, and reference model charts. The physical educators were comparatively less muscular than they thought.

14. Male and female physical educators were significantly more overfat than they reported. Reference model graphs of human physique comparisons showed that more than half the females and males were overfat whereas fewer than a fourth of the female educators and a third of the male educators evaluated themselves as such.

15. The majority of physical educators reported poor personal nutritional habits.

16. Most students felt the physical educators' general appearances were good.

17. Students rated the male physical educators as having better general appearances than the female teachers; students rated more female physical educators "poor" in general appearance.

18. A larger percentage of female physical educators tended to diet more often than male teachers.

Classroom Instruction and Management

1. The majority of all physical educators demonstrated physical activities in class. More male than female educators demonstrated activities.

2. The majority of physical educators were enthusiastic when teaching physical education classes; the students rated male teachers higher than female teachers in enthusiasm.

3. The majority of all physical educators encouraged physical education students to participate in class activities.

4. A preponderance of all physical educators encouraged students to engage in cardiovascular exercise. A greater percentage of male than female physical educators encouraged cardiovascular exercise.

5. The majority of all physical educators had never taught a unit on weight training in physical education classes even though all the surveyed schools had access to weight training equipment.

6. Significantly more male than female physical educators included a teaching unit on weight training. Fewer than one fourth of the female educators included weight training in their lesson plans.

7. The majority of physical educators reported testing the students to assess fitness levels but at a frequency much higher than reported by the students. The physical educators reported substantial testing; the students did not concur.

8. Fewer than half of the physical educators pre- and post-tested students for fitness results.

9. The majority of physical educators personally believed in the benefits of warmup and stretching and reported doing so prior to personal exercise regimens. Likewise, the majority had physical education classes warmup and stretch before engaging in physical activity.

10. More male than female physical educators had instructed students on proper stretching techniques and procedures.

11. A high percentage of all physical educators practiced themselves and had students practice the more accepted technique of slow, static stretching.

12. The majority of physical educators included cooldown within personal exercise sessions as well as in physical education classes.

13. Significantly more female than male physical educators believed in and practiced cooldown.

14. The majority of students felt all physical educators practiced

what they taught; however, they felt that more male than female teachers did so. The students indicated almost half of the female educators did not practice what they taught.

15. The students felt the majority of physical educators were good role models. They rated male teachers ahead of female teachers as role models.

16. Half of the physical education students rated fitness training obtained in high school as average or below.

17. Significantly more male than female physical educators were rated high by the students in terms of presenting overall physical fitness education in high school.

Current Technical Knowledge of Physical Educators

1. Almost half of the physical educators had no available knowledge of the various forms of weight training.

2. Half of the physical educators either did not know about or use isometrics, an inferior weight training technique. Less than half of all educators prescribed isotonic, the preferred weight training technique.

3. Significantly more female than male educators did not identify with the various "iso" weight training techniques.

4. The majority of physical education teachers had not explained various weight training techniques to students.

5. A preponderance of all physical educators were familiar with the Repetition Maximum (RM) Principle of weight training but very few had instructed their students concerning its use.

6. Fewer than half of the physical education teachers had instructed students about pulse-taking techniques; more male than female had done so.

7. Despite current literature the majority of physical educators did not feel the four recognized phases of total fitness, muscular strength, flexibility, bodyfat levels, and cardiovascular function, were equally important.

8. A very high percentage of educators felt all three recognized phases of an exercise workout, warmup, the main workout, and cooldown, were equally important and had passed this belief on to the students.

9. Significantly more male than female physical education teachers had presented the three phases of exercise sessions to students.

10. The vast majority of all physical educators felt exercise could prevent heart attacks but less than half had conveyed this belief to their students.

11. More male than female teachers had explained the exercise-heart attack relationship to students.

12. The majority of physical educators had presented alternate forms of cardiovascular exercise to the students; more female than male teachers had presented these alternate forms.

13. Almost all of the teachers were unfamiliar with the cardiovascular intensity term "METS" or Multiples of Resting Energy Requirements; more female than male educators were knowledgeable about the term.

14. Fewer than half of the educators knew about Dr. Kenneth Cooper and/or his aerobic point system, and very few physical education teachers used and/or discussed Cooper's program with physical education classes.

15. More female than male physical educators were familiar with

Cooper's aerobic program.

16. Fewer than half of all educators considered both diet and exercise equally important for sound, healthy weight loss/weight control; more female than male educators agreed both were equally important. The students reported that more than half the teachers had told them both were equally important.

17. More than a fourth of the physical educators reported "spot reducing" (there is no such thing) and explained/suggested that students practice this technique. More female than male teachers practiced the myth of "spot reducing."

18. Almost one-quarter of all educators, and significantly more male than female teachers, used authority-stated unreliable insurance height/weight/age charts when assessing the nutritional/bodyfat status of students; the students, however, reported that many more teachers used these charts than the educators' responses showed.

19. Approximately one-fourth of the teachers had measured the students' nutritional/bodyfat status.

20. Almost no physical educators used skinfold calipers to determine students' percentage of bodyfat, and of those who did, significantly more female than male physical educators used calipers for assessment.

21. Approximately one-quarter of the educators either practiced themselves or instructed/reinforced students about the myth of "sweating" for body weight loss; significantly more male than female teachers used/advocated this non-effective technique.

22. More female than male physical educators correctly felt

carbohydrates were recognized as the best food source for the exercising body. Additionally, more female than male teachers had explained this principle to their students.

23. A third of the educators erroneously felt protein was the best food for the exercising body.

24. No physical educator felt fat was a useful source of food for the exercising body.

Personal Fitness Monitoring Habits of Physical Educators

1. Physical educators, as a group, did not appear to receive regular physical checkups as suggested by the American Medical Association; female educators appeared to have more regular checkups than males.

2. The majority of educators did not know, or had forgotten, personal blood pressure levels. Of the males who did indicate current knowledge of blood pressure, almost a fourth had systolic and/or diastolic levels high enough to be rated in "poor" categories according to published norm charts. More males than females knew personal blood pressure levels.

3. The majority of teachers had never had cholesterol and/or triglyceride blood fat levels checked. More male than female physical educators had their levels checked.

4. The majority of physical educators knew personal pulse rates but had not instructed/demonstrated pulse-taking techniques to students. More males than females had so instructed/demonstrated these techniques.

5. The greatest majority of physical educators did not know personal Max VO₂ ratings nor had explained, discussed, and/or instructed

students about Max VO₂.

6. The majority of all educators had not counseled/instructed physical education students on the benefits and/or importance of regular monitoring of the physiological processes of the human body.

Female Educators' and Students' Special Physiological Concerns

1. The majority of female physical educators had no personal menstrual problems, continued to exercise normally during menstruation, and felt physical exercise aids menstrual cycle complaints.

2. Dysmenorrhea (painful cramping) was the most common physical complaint of the female physical educators.

3. All physical educators, both male and female, felt physical exercise benefited the female physiology and encouraged female students to continue normal physical activity during menstrual cycles.

4. Female physical education students reported that slightly more than half of the male and female physical educators encouraged continuation of physical activity during menstruation. This finding was in direct conflict with what the physical educators reported.

5. Significantly more male than female physical education teachers excused female students from physical education class during menstruation.

6. Even though all of the teachers felt exercise was beneficial to the female menstrual cycle, only half had so instructed the students.

7. More male than female teachers had instructed the students as to the positive effects of exercise during menstruation.

8. The majority of physical educators reported they recommended weight training for female students, yet the female students reported

that only a fourth of the teachers had done so.

9. Not all physical educators advocated weight training as beneficial for females and a fourth of the educators did not know whether weight training was as beneficial for females as for males.

10. More female than male teachers recommended weight training to female students.

Conclusions

1. The majority of physical educators exercised regularly but intensity was suspect.

2. Weight training for personal fitness or for the students' edification has low priority in gaining and maintaining fitness. Few physical educators use or promote weight training as a viable form of physical fitness.

3. Physical educators use tobacco products more than they admitted according to the students.

4. The majority of physical educators drink alcoholic beverages.

5. Physical educators had a higher preponderance of bodyfat and lower muscularity than they self-evaluated and have a higher opinion of their personal physiques than the students perceived.

6. Male physical educators are better than female physical educators as physical fitness practitioners and/or educators and as high school fitness indoctrinators.

7. Demonstration, encouragement, and/or enthusiasm by the physical educators are most prevalent in the physical education classes.

8. The quality and quantity of physical fitness testing in high schools are suspect.

9. The principles, procedures, and techniques of warmup, stretching, and cooldown during exercise sessions in and out of classes are well-established and well-executed by physical educators.

10. The physical educators are lacking in personal use and student-education of cardiovascular-type exercise monitoring.

11. Student counseling and/or education by physical educators on the benefits and/or importance of regular monitoring of the physiological processes of the human body is inadequate.

12. The current technical knowledge of physical educators concerning physical fitness terminology, weight control, dietary considerations, and measurement is inadequate.

13. Many physical educators practice themselves, and/or reinforce students to practice, the totally baseless physical fitness myths of "spot reducing" and/or "sweating" for weight control.

14. Overall, the total physical fitness education of students in North Carolina public secondary schools as reported by the students and the returned data is suspect.

Recommendations

1. A study should be conducted to discover why weight training has such low priority in high school physical education classes and why it is not more visible.

2. Professional preparation programs in physical education should improve the physique classification information obtained by their students.

3. More research into the actual amount of physical fitness testing going on in secondary school systems should be implemented.

4. A study to determine whether physical educators are keeping up with current technical knowledge/literature in the field of physical fitness should be conducted.

APPENDIXES

APPENDIX A

PHYSICAL EDUCATORS' QUESTIONNAIRE

APPENDIX A

Physical Educators' Questionnaire

Below is the physical educators' questionnaire item inquires and corresponding percentages of subjects that responded to each item used in the analyses of the data for this study; combined percentages were rounded off to the next highest number:

Code: "Both" = combined total percentage of both
male and female educators
answering each item

"Male" = percentage of male educators
answering each item

"Female" = percentage of female educators
answering each item

1. Age

2. Sex

3. Height

4. Weight

5. Position(s): (check all that apply)

	Both	Female	Male
PE teacher	100%	100%	100%
Coach	80%	72%	88%
Athletic Director	9%	0	18%

6. Grade you teach

7. Years experience in physical education profession:

	Both	Female	Male
First year teacher	0	0	0
1-3 years	17%	28%	6%
4-6 years	14%	6%	22%
7-9 years	9%	6%	11%
10-15 years	22%	16%	28%
15 + years	39%	44%	33%

8. How would you classify your physique?

	Both	Female	Male
Ectomorph	28%	44%	11%
Ecto-mesomorph	37%	28%	45%
Mesomorph	9%	6%	11%
Meso-endomorph	28%	22%	33%
Endomorph	0	0	0

9. What is your normal resting pulse?

	Both	Female	Male
Knew	75%	72%	78%
Didn't know	25%	28%	22%

10. Most recent blood pressure:

	Both	Female	Male
Knew	64%	61%	67%
Didn't know	36%	39%	33%

11. When was your last complete physical/medical examination?

	Both	Female	Male
Within the last year	37%	56%	17%
More than one year ago	14%	17%	11%
More than 2 years ago	17%	11%	22%
More than 3 years ago	6%	5%	6%
More than 4 years ago	28%	11%	44%

12. When was the last time you had a cholesterol/triglycerides (fats) blood test?

	Both	Female	Male
Never	73%	78%	67%
Within the last year	9%	0	17%
1-3 years ago	9%	17%	0
4-5 years ago	0	0	0
Over 5 years ago	11%	5%	17%

13. Have you had your percentage of bodyfat determined?

	Both	Female	Male
Never	50%	50%	50%
Within the last year	9%	11%	6%
More than 1 year ago	3%	0	6%
More than 2 years ago	11%	17%	5%
More than 3 years ago	28%	22%	33%

14. If you have had your percentage of bodyfat checked, what method was used?

	Both	Female	Male
Skinfold calipers	80%	70%	89%
Hydrostatic	21%	30%	11%

15. If so, what was your most recent percentage of bodyfat?

	Female	Male
Average bodyfat percent of the ones who knew	18%	13%
Percent who did not know	67%	78%

16. If you don't exercise regularly, is it due to: (check all that apply)

	Both	Female	Male
Lack of time	64%	69%	58%
Illness/handicap	5%	0	9%
Family obligations	11%	12%	9%
Lack of motivation	22%	19%	25%
Exercise not necessary	0	0	0

17. Do you use tobacco products?

	Both	Female	Male
Yes	20%	6%	33%
No	81%	94%	67%

18. If yes, what type tobacco product(s) do you use?

	Both	Female	Male
Cigarettes	61%	100%	22%
Cigars	0	0	0
Chewing tobacco	28%	0	56%
Smokeless tobacco	11%	0	22%

19. Do you drink alcoholic beverages?

	Both	Female	Male
Yes	56%	56%	56%
No	44%	44%	44%

20. If you do drink alcoholic beverages, which of the following do you drink? (check all that apply)

	Both	Female	Male
Beer	51%	45%	56%
"Hard" Liquor	29%	20%	38%
Wine	21%	35%	6%

21. Do you feel habitual physical exercise prevents heart attacks or other major illnesses?

	Both	Female	Male
Yes	95%	100%	89%
No	6%	0	11%

22. Do you know how to find your maximum pulse rate for fitness-related activities?

	Both	Female	Male
Yes	75%	89%	61%
No	25%	11%	39%

23. Do you warmup before exercise?

	Both	Female	Male
Yes	81%	89%	72%
No	20%	11%	28%

24. Do you cooldown after exercise?

	Both	Female	Male
Yes	72%	83%	61%
No	28%	17%	39%

25. Which of the following do you feel is the most important?

	Both	Female	Male
Warmup period	9%	6%	12%
The main workout	12%	6%	18%
Cooldown period	3%	0	5%
All 3 above are equally important	77%	88%	65%

26. Do you do any flexibility/stretching-type exercises?

	Both	Female	Male
Yes	83%	83%	83%
No	17%	17%	17%

27. If yes, what type stretching/flexibility procedures do you use?

	Both	Female	Male
Ballistic bouncing-type	0	0	0
Slow, static-type	83%	83%	83%
Don't know	17%	17%	17%

28. Do you now wear or have you ever worn a plastic belt, rubber suit, jacket, etc. to induce sweating to lose weight?

	Both	Female	Male
Yes	17%	13%	21%
No	83%	87%	79%

29. Do you recommend weight training for your female students or athletes?

	Both	Female	Male
Yes	81%	89%	72%
No	19%	11%	28%

30. Do you know your maximum oxygen uptake (Max VO₂)?

	Both	Female	Male
Yes	3%	0	6%
No	97%	100%	94%

31. Are you familiar with or use Dr. Kenneth Cooper's Aerobic Point System?

	Both	Female	Male
Yes	45%	50%	39%
No	56%	50%	61%

32. Are you familiar with the term "METS" as applied to physical exercise?

	Both	Female	Male
Yes	6%	6%	6%
No	94%	94%	94%

33. Which of the following cardiovascular activities do you pursue?

	Both	Female	Male
None	5%	4%	6%
Walking	18%	16%	21%
Jogging	15%	15%	30%
Walk/jog alternating	7%	9%	4%
Cycling outdoors	6%	11%	0
Cycling indoors	4%	2%	6%
Swimming	12%	9%	15%
Aerobic dancing	8%	16%	0
Treadmill	0	0	0
Minitrampoline	1%	2%	0
Skipping rope	17%	16%	18%

34. The educators were asked the frequency, duration, and intensity of their walking, jogging, cycling, and/or swimming personal programs so that the researcher could judge whether the educators were exercising enough to receive physiological benefits.

35. Do you lift weights for exercise/fitness?

	Both	Female	Male
Yes	39%	39%	39%
No	61%	61%	61%

36. Location of weight training equipment used: (check all that apply)

	Both	Female	Male
Home	5%	0	9%
School	85%	88%	82%
Fitness center, YMCA, etc.	11%	12%	9%
Club (country, sports, etc.)	0	0	0

37. Does your school have weight training equipment for its students and athletes?

	Both	Female	Male
Yes	100%	100%	100%
No	0	0	0

38. Do you feel muscular strength is obtained better and faster using:

	Both	Female	Male
Isometric contraction principles	11%	11%	11%
Isotonic principles	42%	33%	50%
Either method	6%	0	11%
Neither method	3%	0	6%
Don't know	39%	56%	22%

39. Do you feel that "all things being equal" females can benefit just as much or even more from weight training than males?

	Both	Female	Male
Yes	72%	72%	72%
No	9%	11%	6%
Don't know	20%	17%	22%

40. Do you use the "Repetition Maximum (RM) Principle" in your own or your physical education classes' weight training programs?

	Both	Female	Male
Yes	44%	44%	44%
No	28%	33%	22%
Don't know	28%	33%	22%

41. Do you practice or instruct your students to practice the method of "spot reducing" certain body parts?

	Both	Female	Male
Yes	27%	33%	20%
No	74%	67%	80%

42. Have you ever been on a diet? If so, for how long?

	Both	Female	Male
Yes	50%	61%	39%
No	50%	39%	61%

For how long: _____
(place answer here)

43. Evaluate your diet, eating habits, etc.

	Both	Female	Male
Habits sufficient	36%	33%	38%
Needs some improvement	49%	53%	44%
Needs much improvement	16%	14%	18%

44. What do you feel is the best method of weight control?

	Both	Female	Male
Don't know	15%	11%	18%
Dieting	3%	0	5%
Exercise	38%	22%	53%
Both	46%	67%	24%

45. Do you feel that exercise is good for a woman's physiology?

	Both	Female	Male
Yes	100%	100%	100%
No	0	0	0

46. Do you have menstruation problems?

	Female
Yes	24%
No	76%

47. If yes, what problem?

	Female
Irregular periods	25%
Amenorrhea	25%
Dysmenorrhea	50%

48. Do you feel exercise can help dysmenorrhea?

	Female
Yes	100%
No	0

49. Do you continue to exercise normally during your menstrual period?

	Female
Yes	100%
No	0

50. Do you encourage your female students to continue exercising normally during their menstrual period?

	Both	Female	Male
Yes	89%	100%	78%
No	11%	0	22%

51. Check the most important categories below necessary for a person to be physically fit: (check all that apply)

	Both	Female	Male
Cardiorespiratory	55%	43%	67%
Muscular strength	11%	8%	13%
Flexibility	20%	23%	17%
Bodyfat composition	7%	13%	0
All 4 above	8%	13%	3%

52. What method of determining nutritional status do you feel is best?

	Both	Female	Male
Height/weight/age norm charts	25%	17%	32%
Percentage of bodyfat (calipers)	44%	52%	36%
Girths/circumference	13%	17%	9%
None of these	12%	14%	9%
Don't know	7%	0	14%

53. What do you consider to be the most important food group for active players, students, yourself, or any active person?

	Both	Female	Male
Protein	29%	22%	36%
Carbohydrates	68%	72%	64%
Fats	0	0	0
Other(s)	3%	6%	0

54. In physical education classes, do you test your students to assess fitness levels?

	Both	Female	Male
Yes	83%	72%	94%
No	17%	28%	6%

55. If yes, with what frequency do you test?

	Both	Female	Male
Once a semester	33%	35%	31%
Once a year	9%	12%	6%
Pre/Post Testing	52%	53%	50%
Other	7%	0	13%

APPENDIX B

PHYSICAL EDUCATION STUDENTS' QUESTIONNAIRE

APPENDIX B

Physical Education Students' Questionnaire

Below is the physical education students' questionnaire item inquires and respective percentages of students that responded to each item used in the analyses of the data for this study; combined percentages were rounded off to the next highest number:

Code: "Both" = total percentage of both male and female educators as reported by students

"Male" = total percentage of male physical educators as reported by the students

"Female" = total percentage of female physical educators as reported by the students

-
1. Has your physical education teacher ever tested you or your class for physical fitness?

	Both	Female	Male
Yes	62%	50%	74%
No	38%	50%	26%

2. Does your physical education teacher demonstrate activities in class?

	Both	Female	Male
Yes	81%	79%	82%
No	19%	21%	18%

3. Is your physical education teacher enthusiastic in class?

	Both	Female	Male
Yes	77%	73%	80%
No	24%	27%	20%

4. Does your physical education teacher encourage you to participate in physical education class?

	Both	Female	Male
Yes	82%	84%	80%
No	18%	16%	20%

5. Has your class ever had a teaching unit or section on physical fitness or have you been taught how to obtain personal fitness?

	Both	Female	Male
Yes	73%	69%	76%
No	28%	31%	24%

6. Does your physical education teacher smoke, chew tobacco, or use smokeless tobacco?

	Both	Female	Male
Don't know	46%	61%	31%
Yes	21%	10%	31%
No	34%	29%	38%

*Percentages for students who have observed teachers' smoking habits:

	Female	Male
*Yes	25%	45%
*No	75%	55%

7. Does your physical education teacher drink alcoholic beverages?

	Both	Female	Male
Don't know	68%	76%	59%
Yes	2%	0	4%
No	31%	24%	37%

-
8. Has your physical education teacher discussed, explained, taught, or shown you how to "warmup" and "cooldown" before and after exercising?

	Both	Female	Male
Yes	72%	72%	71%
No	29%	28%	29%

9. Has your physical education teacher discussed, explained, taught, or shown you how to do flexibility/stretching exercises?

	Both	Female	Male
Yes	91%	87%	95%
No	9%	13%	5%

10. If yes on the previous question, what type stretching did your physical education teacher use to show you, or the class?

	Both	Female	Male
Don't know	15%	16%	14%
Bouncing up and down	20%	18%	21%
Slow stretch and hold momentarily	55%	54%	56%
Other	11%	12%	9%

11. Has your physical education teacher taught you or the class about physical fitness and its relationship to possibly helping prevent heart attacks?

	Both	Female	Male
Yes	52%	51%	52%
No	49%	49%	48%

-
12. Has your physical education teacher ever shown you how to take your pulse or taught you about pulse rate in selection of exercise intensity?

	Both	Female	Male
Yes	48%	44%	52%
No	52%	56%	48%

13. Has your physical education teacher instructed you or the class in the regular monitoring of pulse rate, blood pressure, fat blood levels, physical examinations, etc. as related to fitness and health assessments?

	Both	Female	Male
Yes	41%	38%	43%
No	60%	62%	57%

14. Does your physical education teacher walk, jog, cycle, swim, aerobic dance, etc. regularly for personal physical fitness?

	Both	Female	Male
Don't know	59%	67%	51%
Yes	32%	23%	41%
No	9%	10%	8%

*Students who have observed teachers' cardiovascular habits:

	Female	Male
*Yes	57%	84%
*No	43%	16%

-
15. Has your physical education teacher taught or shown you or the class how to calculate your maximum pulse rate to determine exercise limits?

	Both	Female	Male
Yes	25%	20%	29%
No	76%	80%	71%

16. Has your physical education teacher ever taught, measured, or explained Max VO₂ to you or the class?

	Both	Female	Male
Yes	3%	0	5%
No	98%	100%	95%

17. Has your physical education teacher ever taught, explained, or mentioned the term 'METS' to you or the class?

	Both	Female	Male
Yes	8%	8%	7%
No	93%	92%	93%

18. Has your physical education teacher ever encouraged you or the class to walk, jog, cycle, swim, etc. for cardiovascular fitness?

	Both	Female	Male
Yes	72%	69%	75%
No	28%	31%	25%

19. Has your physical education teacher ever taught you or the class about alternate forms of cardiovascular exercise such as skipping rope, aerobic dancing, etc.?

	Both	Female	Male
Yes	63%	66%	60%
No	37%	34%	40%

20. Has your physical education teacher ever taught you or the class about Dr. Kenneth Cooper's Aerobic Program?

	Both	Female	Male
Yes	1%	0	2%
No	99%	100%	98%

21. Has your physical education teacher ever measured you or the class' percentage of bodyfat or taught you about its importance to fitness?

	Both	Female	Male
Yes	26%	19%	33%
No	74%	81%	67%

22. If yes to the previous question, what method did your physical educator use to teach you about measuring percentage of bodyfat?

	Both	Female	Male
Don't remember	43%	54%	32%
Skinfold calipers	6%	8%	3%
Height/weight/age charts	48%	38%	58%
Girth measurements	1%	0	2%
Other	3%	0	5%

23. Has your physical education teacher ever taught, explained, or told you about wearing a plastic belt, rubber suit, rubber jacket, etc. to induce sweating as a means to lose body weight?

	Both	Female	Male
Yes	22%	17%	26%
No	79%	83%	74%

24. Has your physical education teacher ever taught, discussed, or explained how students should properly diet or the best methods of weight control.

	Both	Female	Male
Yes	60%	61%	59%
No	40%	39%	41%

25. Has your physical education teacher ever taught or explained the importance of carbohydrates to the exercising body?

	Both	Female	Male
Yes	60%	60%	59%
No	41%	40%	41%

26. Has your physical education teacher ever discussed, taught, explained, or prescribed "spot reducing" to you or the class to lose inches in a certain area of the body?

	Both	Female	Male
Yes	28%	34%	22%
No	72%	66%	78%

27. Does your physical education teacher lift weights regularly for personal fitness?

	Both	Female	Male
Don't know	0	0	0
Yes	55%	23%	87%
No	45%	77%	13%

28. Has your physical education teacher ever had a teaching unit/section on weight training?

	Both	Female	Male
Yes	43%	24%	61%
No	58%	76%	39%

29. Has your physical education teacher ever taught you that females can possibly gain just as much or more from weight training as males?

	Both	Female	Male
Yes	26%	24%	27%
No	75%	76%	73%

30. Has your physical education teacher ever taught you about such weight training terms as isometric, isotonic, RM Principle, etc.?

	Both	Female	Male
Yes	12%	8%	16%
No	88%	92%	84%

31. (Females Only) Does your physical education teacher excuse you from physical education class/physical activity because of your menstruation period?

	Both	Female	Male
Yes	60%	47%	73%
No	40%	53%	27%

32. (Females Only) Has your physical education teacher taught you about the effects regular exercise has on the menstruation cycle and the female body?

	Both	Female	Male
Yes	45%	34%	55%
No	56%	66%	45%

33. Has your physical education teacher ever taught you about the four major areas of physical fitness (i.e., cardiorespiratory, muscular, bodyfat, and flexibility) and their combined and inseparable importance?

	Both	Female	Male
Yes	44%	44%	44%
No	56%	56%	56%

34. Has your physical education teacher ever taught you about the importance of all three phases of exercise (i.e., warmup, the main workout, and cooldown)?

	Both	Female	Male
Yes	66%	59%	73%
No	34%	41%	27%

35. How would you classify your physical education teacher's physique (body build)?

	Both	Female	Male
Slim, lean, skinny	8%	8%	7%
Slim, but muscular	33%	29%	36%
Very muscular	13%	5%	21%
Round, some fat, but some muscle tone	41%	51%	30%
Fat, overweight	7%	7%	6%

36. Overall, is your physical education teacher's general appearance:

	Both	Female	Male
Good; what a PE teacher should look like	59%	50%	67%
Fair	38%	45%	30%
Poor; looks "out-of-shape"	4%	5%	3%

37. Do you think your physical education teacher presents a good role model for physical fitness?

	Both	Female	Male
Yes	74%	67%	80%
No	27%	33%	20%

38. Do you feel that overall, your physical education teachers

"practice what they preach?"

	Both	Female	Male
Yes	62%	54%	69%
No	39%	46%	31%

39. On the scale of 5, how would you grade your knowledge about physical fitness obtained in high school physical education classes that can be used as you progress into adult life?

	Both	Female	Male
0 - No training at all	3%	0	5%
1 - Poor	4%	5%	2%
2 - Fair	16%	19%	12%
3 - Average	30%	34%	26%
4 - Good	32%	29%	34%
5 - Excellent	17%	13%	21%

40. Check whether your physical education teacher is a male or female.

REFERENCES

- Alexander, J. Personal communication at Lumberton Medical Clinic, 19 November 1984.
- Aspy, D. N., & Roebuck, F. N. Kids don't learn from people they don't like. Amherst, MA: Human Resources Development Press, 1977.
- Barghman, M., & Takaha, M., & Tellez, T. Sprint training. National Strength and Conditioning Association Journal, June-July 1984, 6, 34-36.
- Berdie, D. R., & Anderson, J. F. Questionnaires: design and use. Metuchen, NY: The Scarecrow Press, Inc., 1974.
- Brooks, G. A., & Fahey, T. D. Exercise physiology: human bioenergetics and its applications, NY: John Wiley and Sons, 1984.
- Bruning, J. L., & Kintz, B. L. Computational handbook of statistics (2nd ed.). Glenview, Illinois: Scott, Foresman and Company, 1977.
- Brunner, B. C. Personality and motivating factors influencing adult participation in vigorous physical activity. Research Quarterly, 1969, 40, 464-469.
- Bucher, C. A. National adult physical fitness survey: some implications. Journal of Health Physical Education and Recreation, 1974, 45, 8-14.
- Burd, J. J., & Serfustin, L. T. Quest one active living: a guide to fitness, conditioning and health (3rd ed.). Dubuque, Iowa: Kendall/Hunt Publishing Company, 1981.
- Buskick, E. R. Personal communication from the Pennsylvania State University Laboratory for Human Performance Research, 22 April 1983.
- Cooper, K. H. The aerobics way. New York: M. Evans and Company, Inc., 1977.
- Cooper, K. H. The aerobics program for total well-being. New York: M. Evans and Company, Inc., 1982.
- Corbin, C. B. Personal communication from Arizona State University, 18 May 1983.
- Darden, E. Frequently asked questions about muscle, fat, and exercise. Athletic Journal, 1975, 56, 85-89.

- Darden, E. Especially for Women. West Point, New York: Leisure Press, 1977.
- Darden, E. Energy to burn. Nautilus, 1983, 5, 16-21.
- Dayton, L., & Goss, K. How strong can a woman become? Strength Training, 1985, 2, 67-69.
- Delisa, J. A., & DeLateur, B. J. Therapeutic exercise: types and indication. American Family Physician, 1983, 28, 227-233.
- Drew, C. J. Introduction to designing and conducting research (2nd ed.). St. Louis: The C. V. Mosby Company, 1980.
- Dunn, B. The coaches' roundtable. Sports Fitness, 1985, 1, 79-80; 85; 118.
- Feltz, D. L., & Weiss, M. R. Developing self-efficacy through sport. Journal of Physical Education Recreation and Dance, 1982, 53, 24-26.
- Getchell, B. Physical fitness: a way of life (2nd ed.). New York: John Wiley and Sons, Inc., 1979.
- Getchell, B. Being fit a personal guide. New York, John Wiley and Sons, Inc., 1982.
- Groves, D. Research updates. Shape, 1984, 3, 134-135.
- Hall, L. K. Headliners. Shape, 1984, 5, 67.
- Hatfield, F. C. Aerobic weight training. Chicago, Contemporary Books, Inc., 1983.
- Hutchins, K. Healthwise. Nautilus, 1983, 5, 46.
- Isaac, S., & Michael, W. B. Handbook in research and evaluation (2nd ed.). San Diego: Edits Publishers, 1982.
- Karper, W. B., & Dignan, M. B. Exercise habits: do physical education professional in higher education practice what they teach? Journal of Physical Education Recreation and Dance, 1983, 54, 27-29.
- Katch, F. I., Clarkson, P. M., Kroll, W., McBride, T., & Wilcox, A. Effects of sit up exercise training on adipose cell size and adiposity. Research Quarterly for Exercise and Sport, 1984, 55, 242-247. (a)
- Katch, F. I., & Katch, V. L. Overweight vs overfat: the key is composition, not size. Muscle & Fitness, 1984, 45, 82-83; 198. (b)

- Katch, F. I., & Katch, V. L. Physiology. Muscle & Fitness, 1984, 45, 25; 154. (c)
- Killian, W. Personal communication at Pembroke State University, 27 December 1984.
- Kirkendall, D. Skinfold caliper research fat-o-meter. LaCrosse, WS, University of Wisconsin Printing, 1981.
- Kirshenbaum, J. Scoreboard. Sports Illustrated, 1984, 61(21), 6.
- Krejcie, R. V., & Morgan, D. W. Determining sample size for research activities. Educational and Psychological Measurement, 1970, 30, 607-610.
- LaPoint, J. An analysis of the correlates underlying participation in physical activity by male faculty members at the university of toledo. Unpublished doctoral dissertation, University of Toledo, 1972.
- Liefer, M. How does exercise affect menstruation? Nautilus, 1983, 5, 111-114.
- Loucks, H. D. Are physical education majors really fit? Journal of Physical Education and Recreation, 1976, 47, 36.
- Maggard, N. J. Upgrading our image. Journal of Physical Education Recreation and Dance, 1984, 54, 17-18.
- Mayo, D., & Mayo, J. The importance of cooldown. Fit, 1984, 4, 27-30.
- McCandless, P. Personal communication from the University of Illinois at Urbana-Champaign, 19 April 1983.
- Meggyesy, D. Talent plus dedication equals success. Sports Fitness, 1985, 1, 10.
- Mirkin, G. Getting thin. Silver Springs, Maryland: Sportsmedicine Institute of Silver Springs, 1983.
- Purcell, K. Health and fitness-related practices among KAHPER members. KAHPER Journal, 1979, 16, 6-7.
- Reid, M. Attitude and personality differences in physically active and inactive university teachers. Perceptual and Motor Skills, 1976, 43, 523-526.
- Remington, D., Fisher, G., & Parent, E. How to lower your fat thermostat, Provo, Utah, Vitality House International, Inc., 1983.

- Remington, D., Fisher, G., & Parent, E. Exercise: you can't lose fat without it! Shape, 1984, 4, 66-68.
- Scott, H. M. Exercise and high blood pressure. Muscle & Fitness, 1984, 45, 11; 179-180.
- Sifft, J. M. Reading and understanding research: guidelines for selecting a sample. National Strength & Conditioning Association Journal, 1984, 6, 26-27.
- Snyder, E. E. Variations in team status and the coach's influence. Physical Educator, 1975, 32, 124-126.
- Stokes, R., Moore, A. C., Moore, C., & Williams, C. Fitness: the new wave. Winston-Salem, NC: Hunter Textbooks, 1981.
- Stokes, R., & Fark, D. D. Fitness everyone! Winston-Salem, NC: Hunter Textbooks Inc., 1983.
- Tanny, A. Cholesterol and exercise. Sportsmedicine Digest, 1984, 45, 217. (a)
- Tanny, A. Benefits of exercise: myth vs fact. Muscle & Fitness, 1984, 45, 11; 136-137. (b)
- Tanny, A. Shape-up. Muscle & Fitness, 1984, 45, 217. (c)
- Tanny, A. Are you still trying to lose weight? Muscle & Fitness, 1985, 46, 25; 149-150.
- Tuten, R., Knight, V., & Moore, C. Weight training everyone. Winston-Salem, NC: Hunter Textbooks Inc., 1983.
- Vannier, M. & Fait, H. F. Teaching physical education in secondary schools (4th ed.). Philadelphia: W. B. Saunders Company, 1975.
- Vash, P. D. Experts on obesity. Shape, 1984, 4, 62.
- Verabioff, L. J. Teaching physical fitness concepts. CAHPER Journal, 1978, 44, 31-36.
- Westcott, W. L. Teaching by example and increasing one's modeling influence. The Journal of Physical Education, 1977, 75, 15; 20.
- Westcott, W. L. Physical educators and coaches as models of behavior. Journal of Physical Education and Recreation, 1979, 50, 31-32.
- Westcott, W. L. Strength fitness: physiological principles and training techniques. Boston, Allyn and Bacon, Inc., 1982.

Wilmore, J. Athletic training and physical fitness: physiological principles and practices of the conditioning process. Boston, Allyn and Bacon, Inc., 1977.

Wilmore, J. H. Training for sport and activity: the physiological basis of the conditioning process (2nd ed.). Boston, Allyn and Bacon, Inc., 1982.

Wolf, M. D. Research report. Nautilus, 1982, 4, 54-55. (a)

Wolf, M. D. Research report. Nautilus, 1982, 4, 30-31. (b)

Zucker, M. The right stuff. Sports Fitness, 1985, 1, 67-69; 114.

BIBLIOGRAPHY

- Anderson, W. G., & Barrette, G. T. What's going on in the gym: descriptive studies of physical education classes. Motor Skills: Theory into Practice, 1978, 81, 25-38.
- Babb, C. Personal communication at Middle Tennessee State University, 20 July 1984.
- Bahnman, C. P. Measurement and evaluation: improvement needed in physical education. The Journal of Physical Education, 1976, 73, 75.
- Barber, H. Teaching attitudes and behaviors through youth sports. Journal of Physical Education Recreation and Dance, 1982, 53, 21-22.
- Biddulph, L. G. Athletic achievement and the personal and social adjustment of high school boys. Research Quarterly, 1954, 25, 531-534.
- Bier, R. A. How fit are our youth? Chicago Medicine, 1968, 71, 731-736.
- Bleier, T. J., & Reams, D. An approach to developing physical fitness as an integral part of the physical education program. The Physical Educator, 1968, 25, 164-167.
- Broucher, R. L. Leadership in sport, physical education and athletics: a selected bibliography. Physical Educator, 1980, 37, 106-110.
- Buchanan, L. K. Students grade teachers. Fit, 1984, 3, 10.
- Clark, H. H. Responsibilities of physical education to the total person. Paper presented at the Convention of the American Alliance for Health, Physical Education, Recreation and Dance, Houston, Texas April 1982.
- Clarkson, P. M., & Kroll, W., & McBride, T. C. Maximal isometric strength and fiber type composition in power and endurance athletes. European Journal of Applied Physiology, 1980, 44, 35-42.
- Cooper, J. H. Hope for the future: a view of research in teacher effectiveness. Quest, 1977, 28, 28-37.
- Cooper, K. H., & Gey, G. O., & Bottenberg, R. A. Effects of cigarette smoking on endurance performance. Journal of the American Medical Association, 1968, 203, 189-192.
- Cooper, K. H. A means of assessing maximal oxygen uptake. Journal of the American Medical Association, 1968, 203, 201-204.

- Cooper, K. H. Testing and developing cardiovascular fitness within the united states air force. Journal of Occupational Medicine, 1968, 10, 636-639.
- Cooper, K. H. Aerobics. New York: M. Evans and Company, Inc., 1968.
- Cooper, K. H. The new aerobics. Boston: M. Evans and Company, Inc., 1976.
- Danoff, P. L., & Danoff, J. V. Energy cost and heart rate response to static and dynamic leg exercise. Archives of Physical Medicine and Rehabilitation, 1982, 63, 130-134.
- Doolittle, T. L., & Bigbee, R. The twelve-minute run-walk: a test of cardiorespiratory fitness of adolescent boys. Research Quarterly, 1968, 39, 491-495.
- Dayle, J. T., Dawber, T. R., Kannel, W. B., Kinch, S. H., & Kahn, H. A. The relationship of cigarette smoking to coronary heart disease. Journal of the American Medical Association, 1964, 190, 886-890.
- Drinkwater, B. L. Development of an attitude inventory to measure the attitude of high school girls toward physical education as a career. Research Quarterly, 1960, 31, 575-580.
- Dyton, P. E. The attitudes of physical education specialists toward education and the teaching of their subject. Bulletin of Physical Education, 1975, 11, 23-29.
- Editors of Consumer Guide. The running book. New York: Beekman House, 1978.
- Fleck, S. J., & Schutt, R. C. Types of strength training. Orthopedic Clinics of North America, 1983, 14, 449-458.
- Foster, D. Exercise: better than dieting. Strength Training, 1984, 1, 62-64.
- Foster, J. A controlled study of high school athletes muscle growth. Muscle & Fitness, 1985, 46, 47; 171.
- Fox, S. M., & Haskell, W. L. Physical activity and the prevention of coronary heart disease. Bulletin of the New York Academy of Medicine, 1968, 44, 950-967.
- Gallagher, J. R., & Brouha, L. Dynamic physical fitness in adolescence. Yale Journal of Biology and Medicine, 1943, 15, 657-670.
- Galloway, J. A new sport and a new lifestyle has the country on the run. Runner's World, 1982, 17, 52-54; 72.

- Gettman, L. R., Culter, L. A., & Strathman, T. A. Physiologic changes after 20 weeks of isotonic vs isokinetic circuit training. Journal of Sports Medicine and Physical Fitness, 1980, 20, 265-274.
- Golding, L. A. Effects of physical training upon total serum cholesterol levels. Research Quarterly, 1961, 32, 499.
- Gould, D. R. Modeling and motor skill acquisition. Quest, 1981, 33, 214-230.
- Gutin, B. A model of physical fitness and dynamic health. Journal of Physical Education and Recreation, 1980, 51, 48-51.
- Hart, M. E., & Shay, C. T. Relationship between physical fitness and academic success. Research Quarterly, 1964, 35, 443-445.
- Hickson, J. F., Wilmore, J. H., Constable, S. H., & Buono, M. J. Research: energy cost of weight training exercises. National Strength & Conditioning Association Journal, 1984, 6, 22-23.
- Johnson, G. O., & Crabbe, J. M. Are today's coaches practicing what they preach? Today's Jogger, 1978, 2, 46-49.
- Jones, G. Characteristics of new zealand boys' physical education teachers. New Zealand Journal of Health Physical Education and Recreation, 1978, 11, 99-103.
- Kamen, G., Kroll, W., & Zigon, S. T. Exercise effects upon reflex time components in weight lifters and distance runners. Medicine and Science in Sports and Exercise, 1981, 13, 198-204.
- Katch, F., & Katch, V. How smoking reduces fitness. Muscle & Fitness, 1984, 45, 17; 180.
- Kraemer, W. J. Program design: exercise prescription--needs analysis. National Strength & Conditioning Association Journal, 1984, 6, 47.
- Krotee, M. Profiles of a superstar. Sports Fitness, 1985, 1, 63-65.
- Lamb, L. Energy for muscle work. Muscle & Fitness, 1984, 45, 25; 193-196.
- Lester, M., Sheffield, L. T., Trammell, P., & Reeves, T. J. The effect of age and athletic training on the maximal heart rate during muscular exercise. American Heart Journal, 1968, 76, 370-376.
- Liemohn, W., & Knapczyk, D. R. An analysis of the southern california perceptual motor tests. Research Quarterly for Exercise and Sport, 1984, 55, 248-253.

- Lister, R. Sports psychology: not just for pros. Nautilus, 1983, 5, 65-66.
- Mauch, J. E., & Birch, J. W. Guide to the successful thesis and dissertation. New York: Marcell Dekker, Inc., 1983.
- Millman, M., Grundon, W. G., Kasch, F., Wilkerson, B., & Headley, J. Controlled exercise in asthmatic children. Annals of Allergy, 1965, 23, 220-225.
- Mitchell, J. H., & Blomqvist, C. G. Role of exercise in prophylaxis against coronary disease. Dallas Medical Journal, 1968, 54, 534-535.
- Mitrovic, M. Safer and faster weight loss. Shape, 1984, 4, 46.
- Parkey, W. W. Self-concept and school achievement. Englewood Cliffs, New Jersey: Prentice-Hall, 1970.
- Patton, R. W., Watkins, M., & Jackson, A. A normative assessment technique for isotonic in college males on the universal gym. American Corrective Therapy Journal, 1981, 35, 78-81.
- Robbins, S. B. Self-concept and role modeling: their relationship to secondary school physical education. Paper presented at annual meeting of the American Alliance for Health Physical Education Recreation and Dance, Minneapolis, MN, 7-11 April 1983.
- Rochelle, R. H. Blood plasma cholesterol changes during a physical training program. Research Quarterly, 1961, 32, 538.
- Rose, L. I., Bradley, E. M., Kudzma, D. J., & Cooper, K. H. Changes in body composition during intensive physical conditioning. Clinical Research, 1969, 17, 393.
- Sage, G. H. Sociology of physical educator/coaches: personal attributes controversy. Research Quarterly for Exercise and Sport, 1980, 15, 110-121.
- Shaw, E. Somatotyping. Nautilus, 1982, 4, 26-30.
- Sheehan, G. The heart of the matter. The Runner, 1985, 7, 12-13; 16.
- Shepard, G. Motivate your athletes. Bigger Faster Stronger Journal, 1984, 1, 17; 61.
- Survey finds 90 percent of teachers not in good shape. President's Council on Physical Fitness and Sports Newsletter, 1978, p. 11.

- Terraslina, P., Partunen, T., Oja, P., & Koskela, A. Some social characteristics and living habits associated with willingness to participate in a physical activity intervention study. Journal of Sports Medicine for Physical Fitness, 1970, 10, 138-144.
- Vaccaro, P., Ostrove, S. M., Vandervelden, L., Goldfarb, A. H., Clarke, D. H., & Dummer, G. M. Body composition and physiological responses of masters female swimmers 20 to 70 years of age. Research Quarterly for Exercise and Sport, 1984, 55, 278-284.
- Weider, J. Stretch your performance range. Muscle & Fitness, 1984, 45, 89-90.
- Weider, J. Exercise and technology. Muscle & Fitness, 1984, 45, 5; 76.
- Wiggins, J. D. Effective ratings of counselors by coached clients related to attractiveness-fitness variables. American Mental Health Counselors Association Journal, 1980, 2, 83-87.
- Williams, J. F. The principles of physical education (8th ed.). Philadelphia, W. B. Saunders Company, 1964.
- Wise, J. E., Nordberg, R. B., & Reitz, D. J. Methods of research in education. Boston, D. C. Heath and Company, 1967.
- Wolf, M. D. Conditioning. Women's Sports and Fitness, 1984, 6, 12.