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Religiosity and Physical Fitness: A Study of Middle-Aged Mormon Men

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RELIGIOSITY AND PHYSICAL FITNESS:

A STUDY OF MIDDLE-AGED MORMON MEN

by

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GRADUATE COMMITTEE APPROVAL

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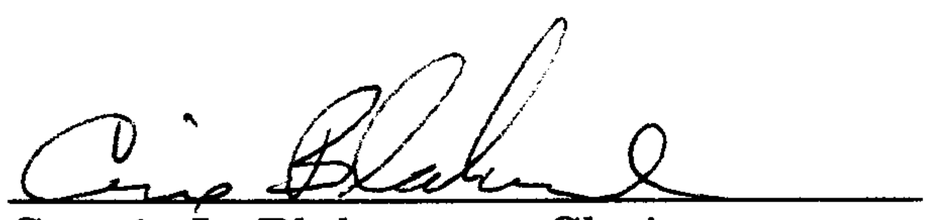
3/8/99	
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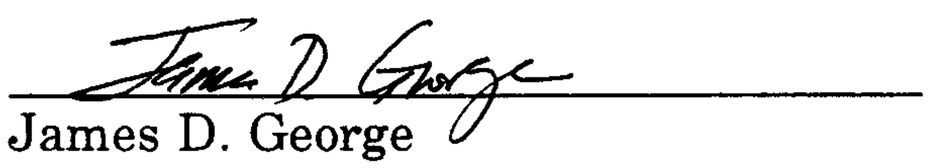
3/9/99	
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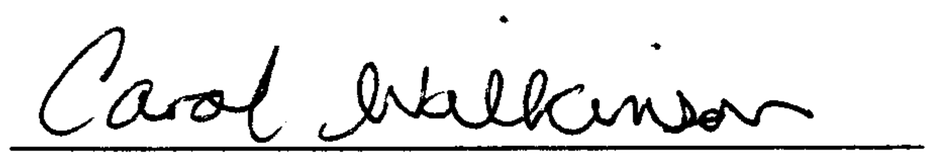
3/10/99	
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ABSTRACT

RELIGIOSITY AND PHYSICAL FITNESS:

A STUDY OF MIDDLE-AGED MORMON MEN

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Masters of Science

Research has related both physical fitness and religiosity to health. This study combined these ideas and examined the relationship between religiosity and physical fitness among middle aged Mormon men (N=110). Mormons are an ideal population for study because of their strict health code. Fitness variables were grip strength, waist/hip ratio, body mass index (BMI) and estimated maximal oxygen uptake (VO_{2max}). A questionnaire assessed level of religiosity and separated subjects into two groups: highly religious (N=35) and less religious (N=14). Moderately religious subjects (N=61) were omitted. A one way ANOVA (between groups design) found no significant differences in fitness variables between groups. Results indicate that fitness and religiosity do not appear to be related among Mormon men. These factors were found to be related among Mormon women (Blakemore,

1997:16). Therefore, an increase in religiosity may be associated with improved physical fitness for Mormon women, however, based on this study no such association can be made for Mormon men.

ABSTRACT

Research has related both physical fitness and religiosity to health. This study combined these ideas and examined the relationship between religiosity and physical fitness among middle aged Mormon men (N=110). Mormons are an ideal population for study because of their strict health code. Fitness variables were grip strength, waist/hip ratio, body mass index (BMI) and estimated maximal oxygen uptake (VO_{2max}). A questionnaire assessed level of religiosity and separated subjects into two groups: highly religious (N=35) and less religious (N=14). Moderately religious subjects (N=61) were omitted. A one way ANOVA (between-groups design) found no significant differences in fitness variables between groups. Results indicate that fitness and religiosity do not appear to be related among Mormon men. These factors were found to be related in Mormon women (Blakemore, 1997:16). Therefore, an increase in religiosity may be associated with improved physical fitness for Mormon women, however, based on this study no such association can be made for Mormon men.

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Religiosity and Physical Fitness:
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Physical Fitness and Health

Physical Fitness has long been used as a measure of general health and well being (American College of Sports Medicine [ACSM], 1995:4; Pate et al., 1995:403; Shephard, 1995:289; Surgeon General, 1996:4). Religiosity, or religious, commitment has also been shown to have a positive relationship with overall good health (Koenig, 1997:93; Larson et al., 1989:276; Mathews, 1995:111). Recently, the Surgeon General (1996:5) stated that over 60% of the general population is not regularly physically active. This high level of inactivity increases health risks and has a negative impact on individual health, fitness, and all-cause mortality rates (Pate et al., 1995:403). Physical activity level has been one factor linked to fitness level. The relationship between health and variables such as low-fat diet, body composition, cholesterol level, smoking, cardiorespiratory function, and metabolic regulation have been widely studied. Another variable that may affect health is the level of religious commitment.

Religiosity and Health

A religious organization can influence health practices by: 1) providing an environment of social support, 2) discouraging health-destructive behaviors (Idler, 1987:228; Koenig et al., 1994:229), 3) creating a system for finding meaning in life, giving peace, and a sense of well being

(Ellison, 1991:87; Idler, 1987:228-229), and 4) providing hope for dealing with physical suffering, dying and death (Vanderpool, 1980:14).

A positive relationship has been demonstrated between high levels of religiosity and general physical health. Mathews' (1995:111) review of 212 studies on religious commitment and health concluded that individuals with higher levels of religious commitment experienced less substance abuse, greater physiological health, improved quality of life, and improved medical outcomes. Finally, 75% of the studies showed overall health benefits for those with religious commitment. Ransom et al. (1992:263) found that religiosity was correlated with health for husbands and wives in 225 families in the California Family Health Project. Religiosity also has been shown to enhance emotional well-being and life satisfaction (Hadaway and Roof, 1978:299; Jensen et al., 1993:1158; Levin et al., 1995:S159; Wright et al., 1993:560). Men who attend church at least once a month are less likely to die from arteriosclerotic heart disease and have lower frequencies of tuberculosis (Comstock and Partridge, 1972:668-669). In Scotland, Hannay (1980:683) interviewed 1,344 Glasgow residents. He found that those who attended church at least once a month had fewer self-reported physical symptoms or complaints during the previous two weeks. Those who pray and are active participants in their religions have been found to have better health (Ferraro and Albrecht-Jenson, 1991:199).

Religiosity seems to be inversely related with health-destructive behaviors (Cochran, 1992:102; Oleckno and Blacconiere, 1991:825). Health destructive behaviors include any behavior that negatively affects health, including consuming harmful substances. Brizer (1993:342) found that "measures of alcohol, hallucinogen, and prescription drug consumption had a significantly negative correlation with religiosity scores" among patients at a clinic for the chemically dependent. In a nationwide sample of over 17,000 high school seniors, it was found that high religiosity was related to a lower level of reported alcohol and marijuana use (Amoateng and Bahr, 1986:64).

Numerous studies demonstrate the health benefits associated with high levels of religiosity among the elderly. Mull et al. (1987:154) found that among the elderly, church attendance was positively related to physical health, health status, and functional capacity. Courtenay et al. (1992:54) indicated a significant relationship between religiosity and physical health in older adults. Higher levels of public religious involvement are associated with lower levels of functional disability and depressive symptomatology in elderly individuals (Idler, 1987:232). Idler and Kasl (1992:1074) continued work with the elderly and found that religious involvement exerts a strong positive effect on health and functional capacity.

Mormon Doctrine about Health

Members of The Church of Jesus Christ of Latter-day Saints or

commonly called Mormon's, are an ideal population for examining the relationship between physical fitness and religiosity. This is because of their lifestyle and the uniform health practices advocated by the church. Mormons may be more physically fit because they have a strict health code called the Word of Wisdom. The Word of Wisdom was originally published in 1833 and describes the need for increased grain and fruit consumption, lower consumption of meat; and abstinence from alcohol, tobacco and strong drinks (Doctrine and Covenants, 1990:175-176). Adherence to the Word of Wisdom is required for participation in many of the ceremonies and rituals within the church.

Research on Mormon Religiosity and Health

A considerable amount of research has been conducted on the Mormon population describing health benefits stemming from these religious lifestyle practices (Gardner and Lyon, 1982:246; Lyon et al., 1978:361; Lyon et al., 1980:1056). Active, practicing Mormons who get moderate exercise, get eight hours of sleep each day, and never smoke live longer than the general population (Enstrom, 1989:1812). Specifically, men live eleven years longer and women six years longer than the general population (VanDenBerghe, 1994:36). Smoking related cancers are significantly lower among Utah Mormon males (Gardner and Lyon, 1982:252). Utah Mormons also have 22% lower cancer mortality rates than the United States population as a whole (Lyon et al., 1980:1057). Although

the health benefits are well documented, it is not known to what extent religiosity is related to physical fitness. Blakemore (1997:16) found that there was a significant relationship between religiosity and physical fitness in middle-aged female members of the Church. This study is designed to expound on Blakemore's (1997:16) work and examine the relationship between religiosity and physical fitness in Mormon men, aged 24-45.

Definitions

For the purposes of this study the following definitions or terms will be used:

Health - characterized by a capacity to enjoy life, an ability to adapt, and the absence of disease (Bouchard et al., 1990:6)

Physical activity - any body movement that results in a substantial increase over the resting energy expenditure (Bouchard et al., 1993:11)

Health-related physical fitness - the status of an individual with respect to: cardiorespiratory endurance, body fat, and muscular strength (Bouchard et al., 1993:11)

Religion - a belief in a higher power or value system which gives meaning to life and leads to the observance of rites, rituals, celebrations, and prayer. These beliefs usually include a moral code of conduct that dictate personal actions (e.g., church attendance, monies donated, and service rendered) (Vanderpool, 1980:8; Cornwall et al., 1986:228; Levin and Vanderpool, 1987:597)

Chapter 1

Introduction

The concept that regular physical activity has a positive impact on physical fitness and overall health has been well established (American College of Sports Medicine [ACSM], 1995; Pate et al., 1995; Shephard, 1995; Surgeon General, 1996). Religious commitment or religiosity has also been shown to have a positive relationship with overall good health (Larson et al., 1989; Mathews, 1995). However, the relationship between religiosity and physical fitness has not been studied extensively. Blakemore (1997) found that there was a significant relationship between religiosity and physical fitness in middle-aged Mormon women. Therefore, this study will examine the relationship between religiosity and physical fitness in middle-aged Mormon men.

Recently the Surgeon General (1996) stated that over 60% of the general population is not regularly active. This high level of inactivity increases health risks and has a negative impact on individual health and fitness (Pate et al., 1995; Foreyt & Goodrick, 1995). Although activity level has been linked to fitness level there are other fitness variables that merit further investigation. One possibility is the connection between high levels of religious commitment and physical fitness, because certain religions have been found to be associated with healthy lifestyle behaviors and health benefits. Mathews' (1995) review of 212 studies on religious commitment

and health concluded that individuals with higher levels of religious commitment experienced less substance abuse, greater physiological health, improved quality of life, and improved medical outcomes; and 75% of the studies showed overall health benefits.

Studying a religious population with a uniformity of religious beliefs makes isolating and studying individual health variables easier. The members of The Church of Jesus Christ of Latter-day Saints (Mormons) are useful for studying health-related issues because of the strict health code practiced by active members.

This study will explore the relationship between level of religiosity and physical fitness. The examination of this relationship within all religions and age groups is beyond the scope of this study. Therefore, this study will examine the correlation between religiosity and physical fitness in male members of the Mormon church aged 25 to 45 years.

Problem Statement

This study will evaluate the relationship between level of religiosity and physical fitness among male members of the Church of Jesus Christ of Latter-day Saints aged 25 to 45 years.

Hypothesis

Null: There will be no significant relationship between level of religiosity and physical fitness in male members of the Church of Jesus Christ of Latter-day Saints aged 25 to 45 years.

Alternative: There will be a significant relationship between level of religiosity and physical fitness in male members of the Church of Jesus Christ of Latter-day Saints aged 25 to 45 years.

Delimitations

The subjects in this study will be residents of the Utah County area. All subjects will meet the following criteria:

1. Subjects will be male.
2. Subjects will be between the ages of 25 to 45 years.
3. All subjects will be members of the Church of Jesus Christ of Latter-day Saints.
4. Subjects will complete a medical screening questionnaire and read and sign an informed consent form.

Basic Assumptions

1. The subjects will give maximal effort during the fitness testing.
2. The subjects will honestly answer the religiosity questionnaire.
3. Subjects will be equally distributed religiously active and inactive male members.

Limitations

1. The sample may not be representative of the international male Mormon population aged 25 to 45 years.
2. The subjects may not answer honestly on the religiosity questionnaire.

Definition of Terms

Health - characterized by a capacity to enjoy life, an ability to adapt, and the absence of disease (Bouchard, Shephard, Stephens, Sutton, & McPherson, 1990)

Physical activity - any body movement that results in a substantial increase over the resting energy expenditure (Bouchard, Shephard, & Stephens, 1993)

Health-related physical fitness - the status of an individual on the health-related physical fitness: cardiorespiratory endurance, body fat and muscular strength

Religion - a belief in a higher power or value system which gives meaning to life and leads to the observance of rites, rituals, celebrations, and prayer. These beliefs usually include a moral code of conduct that dictate personal actions (e.g., church attendance, moneys donated and service rendered)(Cornwall, Albrecht, Cunningham & Pitcher, 1986; Levin & Vanderpool, 1987; Vanderpool, 1980)

Religiosity - The extent to which one puts into practice his or her religious beliefs. Such practice involves commitment (Hoffman, 1992).

Significance of the Study

Those who are more religious tend to have a higher level of health and a decrease in the number of preventable risk factors, suggesting that there is a relationship between religiosity and physical fitness. This study

examines the relationship between high levels of religiosity and physical fitness. If there is indeed a connection between higher levels of religiosity and physical fitness, this could impact the health profession. Doctors, counselors, and psychologists might recommend religion to help patients overcome addictions and to improve general health conditions.

Religiosity - the extent to which one puts into practice his or her religious beliefs. Such practice involves commitment (Cornwall et al., 1986:227)

METHODS

Selection and Control of Subjects

A total of 110 Mormon men, aged 24 to 45 years, were selected as subjects. Approximately every fifth person in the Utah County phone book from the Provo/Orem area was contacted as a potential subject. Due to an insufficient number of willing subjects, calling was supplemented by distribution of flyers, personal contacts, and newspaper advertisements. Each respondent was asked their gender, age, and church affiliation. Each subject was informed about the fitness testing procedures (ACSM, 1995:47-48) prior to the test date. All testing took place in the Human Performance Laboratory at Brigham Young University, Provo, Utah, and the Fitness Room at Utah Valley State College, Orem, Utah. At the testing site, each participant completed a medical screening questionnaire and read and signed an informed consent form as required by the Human Subjects Committee at Brigham Young University. Following testing, subjects received $10.00 for their participation.

Instruments and Testing

Participants initially completed a sixty-five question religiosity questionnaire. Forty-nine questions, dealing with belief, belonging, and

Chapter 3

Methods

Problem Statement

This study will evaluate the relationship between level of religiosity and physical fitness among male members of the Church of Jesus Christ of Latter-day Saints aged 25 to 45 years.

Selection and Control of Subjects

A total of 150 men will be selected as subjects by calling every fifth name in the phone book covering the Utah County communities adjoining Brigham Young University (See Appedix A-1). Each respondent will be asked gender, age, and church affiliation. If Mormon, they will be asked their self-reported religious activity level and if they are willing to come to BYU and participate in a research study requiring testing of physical fitness and completion of a religiosity and physical fitness questionnaire. Subjects must meet the following criteria:

1. Male
2. Aged 25 to 45 years
3. A member of the Church of Jesus Christ of Latter-day Saints

Calling will continue until an equal number of religiously active and less-active Mormons has been obtained. Those who qualify will be paid $10.00 to come and be tested on the Brigham Young University campus. Each subject will be instructed to: a) wear clothing that is appropriate for

physical activity, especially comfortable shoes for walking; b) limit any strenuous physical activity within 4 hours of testing; and c) avoid alcohol, caffeine or the use of tobacco products within 3 hours of testing.

After arriving at the testing site, each participant will complete a preliminary medical screening questionnaire (see Appendix A-2) and will then be informed about the testing procedure and asked to read and sign an informed consent form (see Appendix A-3). Each subject will be given a chance to ask any questions associated with the testing procedures.

Instruments and Testing

The testing will start with each subject filling out the 65-question religiosity questionnaire (see Appendix A-4). The questionnaire will measure religiosity utilizing a model developed and tested by Cornwall et al., (1986). The original questions dealing with parenting will not be used. Additional questions (#13, 17, 20, 26-29, 45-49 and 62-65) about the body, exercise patterns and theology were added. Questions 62-65 were taken from Enstrom (1989).

The physical fitness assessment will then proceed in the following order: Perceived Functional Ability questionnaire (George, Stone, & Burkett, 1997); anthropometric measurements of height, weight, hip and waist circumference, and muscular strength; and possibly a submaximal treadmill test. All of the tests were selected because they are nonthreatening and noninvasive.

All testing will take place in the Human Performance Laboratory at Brigham Young University, Provo, Utah. All evaluators will be trained and experienced with fitness testing.

Anthropometric Measurements

Height and weight will be obtained by utilizing a Detecto-Medic Scale (Detecto Scales, Inc, Brooklyn, NY). Each subject will be instructed to remove their shoes and stand on the scale. Height will be measured to the nearest half inch and weight will be measured to the nearest pound. The waist and hip measurements will be measured with a nonstretching tape measure to the nearest half inch. Waist measurements will be obtained just above the umbilicus and below the ribs (ACSM, 1995). The hip measurement will be taken at the greatest circumference in the buttocks and hips region (ACSM, 1995).

Body Mass Index

Obesity or excessive body fat is a negative health risk (ACSM, 1995). The Body Mass Index (BMI) is moderately correlated to percent fat (r= 0.80) (Brooks, Fahey, & White, 1995). This study will utilize BMI for assessing relative body fat. Nonobese is considered <25 for men and <27 for women. Moderately obese is considered between 25-30 for men and 27-30 for women, and obese is >30 for both men and women (George, Fisher, & Vehrs, 1994). The weight and height recorded above will be converted to kilograms and

meters and utilized in the following formula (Keys, Fidanza, Karvonen, Kimura, & Taylor, 1972).

$$BMI = BW / (Ht)^2$$

Key:

BW = Body Weight (in kilograms)

Ht = Height (in meters)

Muscular Strength

Muscular strength is classified as the ability to exert a force (Brooks et al., 1995). A level of strength is needed for day to day activities and general health (Montoye & Lamphiear, 1977; ACSM, 1995). The hand grip dynamometer is a way of testing muscular strength. The following protocol will be followed in this study (George et al., 1994).

1. The participant assumes a standing position with the head erect, facing straight forward.

2. The participant adjusts the grip dynamometer so that the middle finger's second phalanx opposes the gripping device at a 90° angle.

3. The forearm will be set at a 45° angle and rotates slightly outward.

4. The participant squeezes the grip quickly and maximally, taking no more than a few seconds to perform each trial. Initial body position will not change.

5. Three trials will be done with each hand, with a resting period of approximately 45 seconds between trials.

6. The results will be recorded on the information sheet.

Cardiovascular Endurance

Cardiovascular endurance is best measured by maximal oxygen consumption or VO_{2max} (Brooks et al., 1995; ACSM, 1995). Maximal tests are time consuming and costly to perform. Submaximal tests have been created that are cost effective and have a high correlation with maximal VO_2 tests. This study utilizes two such tests. The George et al., (1997) Perceived Functional Ability questionnaire (see Appendix A-5) will be answered by *all* participants (R = .84, SEE = 3.60 $ml*kg^{-1}*min^{-1}$) and the Ebbeling, Ward, Puleo, Widrick and Rippe (1991) submaximal treadmill walking test (R=0.96, SEE = 4.85 $ml*kg^{-1}*min^{-1}$) will be administered to those participants with less than two exercise risk factors, no history of heart disease, and no acute physical limitations.

For the treadmill test each subject will first be instructed on the testing protocol and will then be fitted with a Polar Pacer heart rate monitor (Polar CIC, Inc., Port Washington, NY). A Precor C94 treadmill (Precor Inc., Bothell, WA) will be used for the test.

The test will begin with each subject warming up at a comfortable but brisk 2.0 to 4.5 mph pace for 4 minutes at 0% grade. During this time the subject's heart rate should reach a steady state heart rate within 50%-

70% of their age-predicted maximum (220 - age). Steady state is reached when consecutive heart rates (30 seconds apart) differ by 3 beats per minute or less. After their heart rate stabilizes, the grade will be raised to 5%. The subject will continue walking until heart rate reaches another steady state or plateau. When this is achieved the test is finished and the subject will be directed to hold onto the railings and continue walking until the treadmill is lowered and decelerated. The steady state heart rate and the treadmill speed will be recorded and utilized in the following VO_{2max} regression equation.

$$VO_{2max} = 15.1 + 21.8\,(SPD) - 0.327\,(HR) - 0.263\,(SPD)\,(AGE) + 0.00504\,(HR)\,(AGE) + 5.98(Gender)$$

Key:

SPD = Speed - Miles Per Hour

HR = Heart Rate - Beats Per Minute

AGE = in years

Gender= Male - 1, Female - 0

Analysis

All testing results will be recorded on a testing results form (see Appendix A-6). The independent variable is the participant's current religious commitment as measured by the questionnaire. The dependent variable is the level of physical fitness at the time of testing. Numerical responses on the religiosity questionnaire will be tabulated and statistically

separated into religious activity levels by a between-groups ANOVA. A regression will also be run to see what physical fitness variance can be accounted for by religioisty.

spiritual commitment, were used from a model developed and tested by Cornwall et al. (1986:228-233). The original questions dealing with parenting were not used. Two additional questions about the body (#13,17) and fourteen about exercise patterns were added (# 20, 26-29, 45-49 and 62-65). Questions 62-65 were taken from Enstrom (1989:1808). To explore the relationship between religiosity and physical activity level a physical activity rating questionnaire was also filled out (George et al., 1997:418).

Maximal oxygen uptake, or VO_{2max}, was estimated using a submaximal treadmill walking test (Ebbeling et al., 1991:968). Anthropometric measurements of height, weight, hips (widest point), and waist circumference (at the umbilicus) were measured. Body composition was estimated by Body Mass Index (BMI) and was calculated from height and weight measurements (Keys et al., 1972:339). Muscular strength was measured with a hand grip dynamometer (Montoye and Lamphiear, 1977:111). The second of two trials with each hand was recorded. All subjects completed the testing in the same order and were tested by experienced exercise test technicians. All tests were selected because of their reliability, ease of administration, and because they were nonthreatening and noninvasive.

ANALYSIS

Likert scale responses for the five questions that specifically assessed church attendance, monies paid, and church service on the religiosity

questionnaire were summed to create a total religiosity score. These questions are as follows:

Question #10 = I like going to church on sunday.

(Range 1-6: Not at all - Somewhat - Exactly)

Question #30 = How often do you attend sacrament meeting.

(Range 1-6: Never - Once a Month - Usually)

Question #45 = I pay a full tithing.

(Range 1-6: No, never - Yes, a little - Yes, a lot)

Question #48 = I pay fast offerings.

(Range 1-6: No, never - Yes, a little - Yes, a lot)

Question #49 = I hold a church calling.

(Range 1-6: No, never - Yes, a little - Yes, a lot)

These questions were selected using canonical techniques as the only significant questions measuring the level of religiosity in the study of Mormon women (Blakemore, 1997:16). A point total was determined by adding the numerical responses to each question. This sum provided a numerical representation of each subject's level of religiosity. Subjects were separated into groups based on this total (range 0-29). Division cut points were set to optimally distinguish religiosity level. From the total subjects (N=110), those with scores below 18 (N=14) were considered less religious, and those with scores of 29 (N=35) were considered highly religious. Those with scores between 18 and 29 (N=61) were considered moderately religious

and were not used in the physical fitness analysis. A one-way ANOVA (between-groups design) was used to determine the difference in fitness between the less religious and highly religious groups.

RESULTS

In this sample of Mormon men, aged 24 to 45 years, there was no statistical difference between any of the physical fitness variables between groups. There was however, a significant difference ($P<.0388$) between physical activity levels when the high and moderate religious groups were combined. Significance was set at $p<.05$ and the results are listed in Table 1.

(Table 1 about here)

DISCUSSION

One of the unique characteristics of this study is that its findings are contrary to a similar study done by Blakemore (1997:16) with Mormon women. In Blakemore (1997:16) a significant difference was found between highly religious Mormon women and less religious Mormon women on the physical fitness variables of body composition, waist circumference, and waist-to-hip ratio.

Factors that may have influenced the outcome could be the sensitivity of the tests and the sample population characteristics. The physical fitness tests were originally chosen because of their noninvasive protocols and ease of administration to large numbers of participants. The sensitivity of these

tests may not have been sufficient to detect differences that may exist within the population. A series of more accurate or precise tests, such as a blood profile, hydrostatic weighing or a maximal exertion treadmill test to measure VO_{2max}, may have found significant differences in the fitness variables. This study did find that the grip measurements were average and the VO_{2max} measurements were above average, compaired to the general population. It is interesting that grip tests for both groups were moving toward significance ($p>.1214$ and .1561). The entire sample population BMI mean was borderline nonobese to moderately obese. This shows that the population, as a whole, is relatively homogenous and healthy regardless of religiosity level.

Utah County is currently one of the most religiously active areas within the Mormon church worldwide. This made it difficult to find less religious subjects and limited the sample size. A larger sample size may have found significant differences. Historically, the state of Utah has one of the nation's lowest percentages of smokers and a lower recorded level of smoking-related illnesses (Gardner and Lyon, 1982:243). A study done by Lyon et al. (1978:364) illustrated that Utah non-Mormons had a significantly lower incidence of lung cancer than the national average, but still higher than Utah Mormons. This suggests that less religious Mormons in this study may be affected by the strong Mormon influence regarding abstinence from harmful substances. Only 10% of the sample population

smoked. A higher percentage of smokers among the subjects would likely have influenced the fitness results.

Among a national sample of high school seniors, Mormons were the least likely to use marijuana and had a significantly lower consumption rate of other harmful substances (Amoateng and Bahr, 1986:71). There was a large difference in alcohol and marijuana use between religious and less religious Mormon youth. Less religious Mormons consumed both substances at the same rate as the sample population. The religious Mormons had a significantly lower consumption rate (Amoateng and Bahr, 1986:64). It would be interesting to assess fitness and religiosity among high school or young adult age groups.

It is true that there is a decrease in health-destructive behaviors and an increase in general health with higher levels of education (Hay, 1988:1322). The education level of the entire sample population was relatively high; 55.9% had at least four years of post-high school education, 15.6% had three years and 17.4% had at least two. There was no apparent difference in education level between groups. The education level in the current sample may have influenced the outcome.

Mormons as a whole are encouraged to be actively involved in their families and in the community. This involvement, and the associated responsibilities and time commitments, may limit the possibilities for physical activity. These meetings and planned activities can influence male

members in a variety of ways. The young men of the Church may participate in Church programs involving physical activity. Over time they may lose interest in the church doctrine and still maintain a high level of physical activity. Conversely, adult members that remain religiously active may be called upon to serve in administrative Church positions and be required to attend many sedentary meetings potentially decreasing their physical activity level. These possibilities may help to explain the homogeneous level of physical fitness found between religiously active and inactive groups.

After completing the analysis and finding no significant differences between highly religious and less religious groups based on physical fitness levels, the differences between physical activity levels were examined. There was initially no significant difference between physical activity level. However, there was a significant difference when the moderate and highly religious groups were combined. Physical activity was assessed on a ten point scale with zero being avoiding exertion and a ten being vigorous activity. The less religious group was 3.36 or at the lower end of moderately physically active. The combined high and moderate religious group were 4.72 or at the higher end of the vigorous activity. This result suggests a possible relationship between higher levels of physical activity and higher levels of religiosity, with the moderately religious actually having the highest physical activity levels. This also suggests that the

moderately religious participants value physical activity more than religiosity. Blair (1989:2401) found that there is an overall decrease in mortality rate with an increase in physical activity. This complements the work done by Enstrom (1989:1812), who found that on health-related mortality rates also decrease with an increase in Mormon religiosity. Both studies illustrate a decrease in mortality rates, and this may also support a possible tie between religiosity and physical activity. Further study is needed to truly relate physical activity with religiosity.

An interesting observation of the five religiosity questions shows that all five questions are action based. The action and overall commitment needed to actually attend church services, give monies, and fulfill church callings may be the same commitment needed to obtain and maintain physical fitness. This may be why these questions where found to be significant for Mormon women (Blakemore 1997:16). We know research has shown that women are more religious than men (Mull et al., 1987:156). Some reasons for this could be that women may utilize the religious benefits of a social network, a place to belong, and a place to find personal meaning. In this setting women can find the social support needed to maintain physical activity and ultimately physical fitness. They may work out with other church members and may participate in fitness classes taught by the church. Men often have found their social outlet or support through the

work place and other clubs or organizations. This may be a factor in why religion may not fulfill this role in this study.

CONCLUSION

A substantial amount of research supports the association between high religiosity and increased health benefits. Physical activity is also associated with increased health benefits. Evidence suggests that Mormons enjoy health benefits due to their theology practices. Within this sample population there is not a significant correlation between religiosity and physical fitness for male members of the Mormon church between 24-45 years of age. To better understand the relationship between physical fitness and religious commitment, more research is needed. Within the Mormon church, it would be of interest to assess Mormons outside Utah County and also outside the state of Utah. This would help remove the strong Mormon influence on Mormons who are less religious. Also, a location with no predominate religion would illustrate the relationship between religion (not just one religion) and physical fitness. Studying other specific religious denominations to determine if a relationship exists between physical fitness and religiosity would also be beneficial in understanding how religiosity can influence physical fitness and overall health. Longitudinal studies evaluating changes in fitness levels compared to changes in religious commitment levels over time would help clarify the strength of the relationship between fitness and religiosity. It would also be interesting to

examine the possible relationship between religiosity and the variables of physical activity, nutritional practices, obesity, and smoking. This list is by no means all inclusive. This study found that physical activity is one factor that may help explain a possible link between religiosity and physical fitness. All of the other factors merit investigation.

Fitness and religiosity appear to be related among Mormon women but, based on our findings, not Mormon men. Therefore, an increase in religiosity may be associated with improved physical fitness for Mormon women. However, no such association can be made for Mormon men. It is recommended that further research be done to substantiate the results found in these two studies.

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Table 1

Physical Fitness by Religious Activity Level

Fitness Variables	Less-religious (N=14)	Highly-religious (N=35)	P-Values
BMI	25.6 ± 5.39	26.4 ± 4.00	.5425
Waist/Hip Ratio	.868 ± .067	.867 ± .068	.9670
Right Grip	45.9 ± 9.82	50.5 ± 9.27	.1214
Left Grip	46.3 ± 10.8	49.9 ± 9.01	.1561
VO_2	52.6 ± 9.01	51.1 ± 8.88	.6076

(No statistically significant differences between groups)

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Appendix A

Prospectus

Chapter 2

Review of Literature

Physical Activity and Health

A substantial amount of research has illustrated a relationship between physical activity and health (Blair, 1995; Pate, 1995; Shephard, 1995). Historically, there has been an emphasis on reaching and maintaining high physical fitness levels. Vigorous exercise for at least 20 minutes 3 times a week was recommended (Pate, 1995). Recently there was a progressive shift away from an emphasis on continuous, vigorous exercise to one that is more focused on health benefits. The American College of Sports Medicine and the Centers for Disease Control recommended that 30 minutes of accumulated, moderate-intensity physical activity is needed per day to receive health benefits (Pate 1995; Pate et al., 1995). Shephard (1995) summarized the work of over 100 experts substantiating the positive effects of physical activity on certain health conditions. With all of the evidence substantiating the relationship between physical activity and better health, it is hard to understand why over 60% of the adult population (Surgeon General, 1996) choose to be physically inactive.

Statistics show that physical activity decreases with age, primarily in the adolescent and young adult years (Surgeon General, 1996), and women are generally less physically active than men (Pate et al., 1995). This age and gender related decrease in activity will ultimately be followed by a

decrease in physical fitness during later life. However, religiosity has been found to exert a strong positive effect on the health of the elderly (Courtenay, Poon, Martin, Clayton, & Johnson, 1992; Idler, 1987; Idler, 1994; Idler & Kasl, 1992; Mull, Cox & Sullivan, 1987). This suggests a possible relationship between religiosity and physical fitness that will counteract the decline of health with age. The connection between religiosity and physical activity and well-being merits exploration.

Religiosity and Health

A religious organization can influence health practices in at least two ways: a) provide an environment of social support (Gottlieb & Green, 1984), and b) discourage health destructive behaviors (Bahr, 1994).

Social Support

There is a positive relationship between high levels of religiosity and physical health (Idler, 1994; Idler & Kasl, 1992; Levin, 1988; Mathews, 1995; Ransom, Fisher & Terry, 1992). Religiosity also enhances emotional well-being and life satisfaction (Ellison, 1991; Hadaway & Roof, 1978; Hall, 1992; Koenig, George, & Siegler, 1988; Jensen, Jensen, & Wiederhold, 1993; Levin, Chatters, & Taylor, 1995; Wright, Frost, & Wisecarver, 1993). Those who attend church at least once a month are healthier (Comstock & Partridge, 1972; Hannay, 1980) and those who pray and are active participants in their religions have better health (Ferraro & Albrecht-Jenson, 1991). Religiosity has also been correlated to an increased recovery

rate from hip replacement in elderly women (Pressman, Lyons, Larson, & Strain, 1990).

Health Destructive Behaviors

This includes any behavior that negatively affects health, including harmful substances. Religiosity seems to be inversely related with health destructive behaviors (Amoateng & Bahr, 1986; Brizer, 1993; Brown & Gary, 1994; Cochran, 1992; Koenig, George, Meador, Blazer, & Ford, 1994; Oleckno & Blacconiere ,1991; Perkins, 1985; Robles, 1987), although the relationship is the strongest within religions that teach abstinence from harmful substances (Bahr, 1994).

Religiosity and Physical Fitness

Physical activity itself was linked to religious worship in the Greek culture. The Olympics were originally organized as religious festivals meant to bring communities together while worshiping the Gods (Esterling & Muir, 1987). History also shows that exercise was used as a form of preventive medicine in the Greek culture (Park, 1995).

The Christian belief system involves an innate respect for the human body. Pope John Paul II, in 1979, discussed how sports promote "educating, developing, and strengthening the human body" (Kerrigan, 1992, 253). He continued by saying that taking care of the physical body is a personal responsibility. Most organized religions do include some kind of

health code, whether it be a recommendation or a "theologically based" commandment.

The clergy have been found to have a longer life expectancy and lower mortality rates (King & Bailar, 1969; King & Locke, 1980). Colligon (1985) showed a significant relationship between religiosity and physical activity. Blakemore (1997) found a significant correlation between religiosity and physical fitness in middle-aged Mormon women.

Health and the Mormon (Latter-day Saints) Church

The uniformity of health practices within the Mormon church makes its members an ideal population for examining the relationship between physical fitness and a specific religion's theology. This is especially true when comparing religiously active and less-active individuals.

Mormons have a strict health code called the Word of Wisdom. The Word of Wisdom was originally published in 1833 and describes the need for increased grain and fruit consumption, lower consumption of some meats and abstinence from alcohol, tobacco and strong drinks (Doctrine & Covenants, 1990, pp. 175-176). To encourage adherence to the Word of Wisdom, observance is required for participation in many of the rites and rituals within the church. A considerable amount of research has been conducted on the Mormon population explaining health benefits stemming from religious practices (Enstrom, 1989; Gardner & Lyon, 1982; Lyon,

Gardner, & West, 1980; Lyon, Wetzler, Gardner, Klauber, & Williams, 1978).

The Word of Wisdom may be partially responsible for the finding that active, practicing Mormon men live 11 years longer and Mormon women live 6 years longer than the general population (VanDenBerghe, 1994). Smoking related cancers were significantly lower in the Utah Mormon male population (Gardner & Lyon, 1982; Lyon et al., 1980) and Utah Mormons have 22% to 35% lower cancer mortality rates than the United States population as a whole (Lyon et al., 1980; Lyon et al., 1978). Among a national sample of high school seniors, Mormons were the least likely of any religion to use marijuana and had a significantly lower consumption rate of other harmful substances (Amoateng & Bahr, 1986).

Conclusion

A substantial amount of research supports the association between high religiosity and increased health benefits. Physical activity has also been correlated to increased health benefits. Evidence suggests that Mormons enjoy various health benefits due to theology practices. A relationship between religiosity and physical fitness has been established in middle-aged Mormon women (Blakemore, 1997). This study is designed to extend that earlier work and examine religiosity and physical fitness in religiously active and less-active Mormon men aged 25 to 45 years.

Appendix A-1

Telephone Dialogue

Telephone Dialogue

Hello, my name is _____ (Janette Olsen) and I am a graduate student at Brigham Young University. I am currently conducting a research study for my masters degree. I am examining the relationship between levels of religious commitment and physical fitness in LDS men. Do any LDS men between the ages of 25 and 45 live here?

If interested they (you) will be paid $10.00 to come to BYU for testing. All testing will take about one hour and fifteen minutes.

They (You) will be asked to complete a questionnaire on religious commitment and physical activity taking no more than 30 minutes and participate in a physical fitness assessment that will take no more than 45 minutes. The assessment will include body measurements(height, weight, waist, hip), a hand grip strength test and possibly a 6 - 7 minute treadmill walking test. The total testing will take no more than one hour and fifteen minutes.

May I ask you 2 questions to verify that you fit within the subject criteria? Let me assure you that all information will be held confidential.

How religiously active would you say you are? (active or inactive?)
How often have you attended Sacrament Meeting in the last two months?

Can you come in on_____? What time is convenient for you_____?

On the day of testing please:

1. Wear light weight clothing that is appropriate for physical activity and comfortable walking shoes.
2. Limit strenuous physical activity for four hours before testing.
3. Avoid alcohol, caffeine or the use of tobacco products within 3 hrs of testing.

Do you have any questions?
May we call you to remind you of your appointment?

Appendix A-2

Preliminary Medical Screening Questionnaire

Preliminary Medical Screening Questionnaire

Circle the most appropriate answer

1. Has a physician every told you that you have a heart condition and advised you to only perform physical activity under a physician's direction?

   Yes / No

2. Do you ever experience chest pain during physical activity?

   Yes / No

3. Have you experienced any chest pain unrelated to physical activity within the last month?

   Yes / No

4. Do you ever feel dizzy to the point of loosing your balance or consciousness.

   Yes / No

5. Do you have any problems with your joints or bones that would be aggravated by physical activity?

   Yes / No

6. Are you currently or have you ever taken medication for a heart condition or blood pressure?

   Yes / No

7. Is there any other reason why you should not exercise without medical supervision?

   Yes / No

8. Do you have a common cold or any other temporary illness that causes you to currently not feel well?

   Yes / No

Note: If any of the above are answered with a yes the physical assessment will be postponed.

Appendix A-3

Informed Consent To be a Research Subject

Informed Consent To be a Research Subject

Explanation of the Test

The purpose of this study is to determine if there is a relationship between religious commitment and physical fitness. This research is being conducted by Janette Olsen, a graduate student in Physical Education at Brigham Young University.

Participation includes one day of testing that will last approximately one hour and fifteen minutes and will take place in the Human Performance Research Center (HPRC) in the Richards Building (Rm 123) on the BYU campus. You will be asked to fill out a 64 question religious commitment questionnaire, a physical activity questionnaire and complete a physical fitness assessment including anthropometric measures, muscular strength and possibly a submaximal treadmill test.

* Anthropometric measures include height, weight and waist and hip circumferences.

* Muscular strength will include gripping a hand dynamometer maximally 3 times with each hand, with 45 seconds between each trial.

* The submaximal walking test will require you to walk at 50-70% of your age- predicted maximal heart rate, a brisk but comfortable pace, for approximately 4 minutes. Then the treadmill grade will be raised to 5% and walking will continue until your heart rate reaches a steady state. (This test will only be completed by those with less than two physical activity risk factors and those with no history of heart disease)

Attendant Risks and Discomforts

If the preliminary medical screening questionnaire is answered correctly the health risks associated with this study are minimal. Yet, you could experience an abnormal blood pressure, fainting, irregular heart beats and in extremely rare instances, musculoskeletal injury or heart attack. There is a slight possibility you will experience muscle soreness 24-48 hours after testing. Trained personnel will be in attendance during all testing to take care of any unusual situation that may arise.

The results of this research study may be published but all personal information obtained through testing will be treated as privileged and confidential. For the purpose of statistical analysis, your name will be given a numbered code and any test data and/or results will not be associated with your name.

please initial when you are finished reading this page_____

Responsibilities of the Participant

Answer all questions about your religious status and physical activity honestly and objectively to the best of your knowledge. All information about your current health status and any past or current unusual feelings of discomfort during exercise or testing should be promptly disclosed to the testing staff.

Benefits to be Expected

The testing will allow you to know your current physical fitness on anthropometric measures, muscular strength and a treadmill walking test.

Stipend

You will be paid $10.00 for your participation in this study.

Inquiries

There will be trained personnel during all phases of testing to answer any questions that you have. If you have any further questions about *this study* you may contact Janette Olsen (home phone: 225-2456, work phone 378-2697).

If you have any questions regarding your rights as a participant in this research study, you may contact Dr. Larry Wood, Chair of the Institutional Review Board, 1122 SWKT, Brigham Young University, Provo, Utah, 84602; phone 378-3405.

Freedom of Consent

Your permission to perform this exercise test is voluntary. You are free to stop the test at any point if you desire.

I have read this form, and I understand the test procedures that I will perform and the attendant benefits and risks. Knowing these risks and discomforts, and having had an opportunity to ask questions that have been answered to my satisfaction, I consent to participate in these tests.

Signature of Participant	Date
Signature of Witness	Date

Appendix A-4

Religiosity Questionnaire

Subject #_____ Date_____ Describes me

		Not at all	Not very much	Some-what	Very much	Exactly
1.	I believe Jesus Christ is the son of God.	1	2	3	4	5
2.	I have found the people in my ward ready and willing to make friends with me.	1	2	3	4	5
3.	The main reason I go to church on Sunday is to learn more about my religion.	1	2	3	4	5
4.	My relationship with God is important to me.	1	2	3	4	5
5.	I have felt left out of some ward or branch social activities.	1	2	3	4	5
6.	I believe the Book of Mormon is the word of God.	1	2	3	4	5
7.	I think the adults in our ward really care about the youth.	1	2	3	4	5
8.	I have been guided or inspired by the spirit of God with some of my problems and decisions.	1	2	3	4	5
9.	I feel church leaders and members really understand me.	1	2	3	4	5
10.	I like going to church on Sunday.	1	2	3	4	5
11.	I feel worthy to enter God's presence.	1	2	3	4	5
12.	The main reason I go to church on Sunday is to be with friends.	1	2	3	4	5
13.	I feel the body is sacred.	1	2	3	4	5
14.	I know what it feels like to repent and be forgiven.	1	2	3	4	5
15.	I believe I can be religious without attending church, i.e., while hiking in the mountains.	1	2	3	4	5
16.	I know that God exists.	1	2	3	4	5
17.	I believe the body and the spirit together make up the soul.	1	2	3	4	5

		Describes me:				
		Not at all	Not, very much	Some-what	Very much	Exactly
18.	I believe God approves of the way I live my life.	1	2	3	4	5
19.	The main reason I go to church on Sunday is so my children will go. (leave blank if you have no children)	1	2	3	4	5
20.	I believe I should exercise and keep my body fit.	1	2	3	4	5
21.	I have felt the Spirit of God in sacrament meeting.	1	2	3	4	5
22.	Sometimes I think the LDS religion is too strict.	1	2	3	4	5
23.	I have a lot in common with other Latter-day Saints.	1	2	3	4	5
24.	The Holy Ghost is an important influence in my life.	1	2	3	4	5
25.	I think church meetings are boring.	1	2	3	4	5

I adhere to the doctrine of the word of wisdom:

26.	No alcohol	1	2	3	4	5
27.	No tobacco	1	2	3	4	5
28.	No tea/coffee	1	2	3	4	5
29	No drugs	1	2	3	4	5

30. How often do you attend sacrament meeting? (Circle one number.)

1 Never
2 Few times a year (on special occasions)
3 About every other month
4 About once a month
5 Two or three times a month
6 Usually every Sunday

31. Overall how important is organized religion in your life? (Circle one number.)

1 It is the most important thing in my life.
2 It is one of the most important things in my life.
3 It is somewhat important in my life.
4 It is not very important in my life.
5 It is the least important thing in my life.

Have you ever had any of the following religious experiences?

		Yes, I'm sure I have	Yes, I think I have	No, but I would like to	No, I never have
32.	Felt the Spirit of God	1	2	3	4
33.	Received a personal witness that the LDS Church is true	1	2	3	4
34.	Felt God's forgiveness	1	2	3	4
35.	Received an answer to your prayers	1	2	3	4
36.	Made a commitment to follow Christ	1	2	3	4
37.	Felt God's love	1	2	3	4

38. How happy are about the kind of person you are? (Circle one number)

1 Not at all happy
2 Not very happy
3 Somewhat happy
4 Pretty happy
5 Very happy

Do you ever feel like the following?

		No, never	Yes, a little	Yes, a lot
39.	I am no good	1	2	3
40.	There is a lot wrong with me	1	2	3
41.	I get a lot of fun out of life	1	2	3
42.	I am not much good at anything	1	2	3
43.	Mostly I think I am quite a happy person	1	2	3
44.	I think I am no good at all	1	2	3

I participate in the following LDS Church related activities:

		No, never	Yes, a little	Yes, a lot
45.	Pay a full tithing	1	2	3
46.	Read the scriptures daily	1	2	3
47.	Pray daily	1	2	3
48.	Pay fast offerings	1	2	3
49.	Hold a church calling	1	2	3

50. Are you: (Circle one number) 1. Female
2. Male

51.	(If female) What is your husband's Priesthood? (Answer only if married)		(If male) What is your Priesthood	
	1	Unordained	1	Unordained
	2	Deacon	2	Deacon
	3	Teacher	3	Teacher
	4	Priest	4	Priest
	5	Elder	5	Elder
	6	High Priest	6	High Priest
	7	Don't know	7	Don't know
	8	Not married or spouse not LDS	8	Not LDS

52. Do you work for pay?

1 Yes--If yes answer questions 54 and 55.
2 No--If no are you:

53.
1 a full-time homemaker
2 not employed, not looking for work
3 not employed, looking for work
4 retired
5 disabled

54. What kind of work do you do?_____

55. How many hours per week do you usually work (at all jobs)?

_____ hours per week

56. What is your current marital status?

1 Married (first time)
2 Remarried after divorce
3 Remarried after death of spouse
4 Widowed
5 Never married
6 Divorced or separated

57. Does your spouse belong to the LDS Church? (Answer only if currently married)

1 yes 2 no

58. What type of ceremony did you have for your most recent marriage?

1 Civil
2 Church
3 Civil or church followed by temple ceremony
4 Temple ceremony
5 Does not apply

59. What is your age? ____

60. What is your race:

a. Caucasian b. Asian c. Native American d. African American e. other

61. Circle the highest grade in school you have completed:

1 2 3 4 5 6 7 8	9 10 11 12	13 14 15 16	14 18 19 20+
Elementary	High School	College/Technical School	Graduate School

62. How many hours of sleep do you usually get per night?

a. 4 or less
b. 5-6
c. 7-8
d. 9 or more

63. How would you rate your participation inactive sports?

a. often b. sometimes

64. How would you rate your participation in physical exercise?

a. often b. sometimes

65. How would you rate your current health status?

a. good b. fair c. poor

Appendix A-5

Perceived Functional Ability Questionnaire

Perceived Functional Ability Questionnaire

Suppose you were going to exercise continuously on an indoor track for 1 mile. Which exercise pace is just right for you--not too easy and not too hard?

Circle the appropriate number (any number, 1 to 13).

1 Walking at a *slow* pace (18 minutes per mile or more)
2
3 Walking at a *medium* pace (16 minutes per mile)
4
5 Walking at a *fast* pace (14 minutes per mile)
6
7 Jogging at a *slow* pace (12 minutes per mile)
8
9 Jogging at a *medium* pace (10 minutes per mile)
10
11 Jogging at a *fast* pace (8 minutes per mile)
12
13 Running at a *fast* pace (7 minutes per mile or less)

Note: If you are unfamiliar with pace times in minutes per mile, then use the other descriptive information to answer the question.

How fast could you cover a distance of 3-miles and NOT become breathless or overly fatigued? Be realistic.

Circle the appropriate number (any number, 1 to 13)

1 I could walk the entire distance at a *slow* pace (18 min. per mile or more)
2
3 I could walk the entire distance at a *medium* pace (16 minutes per mile)
4
5 I could walk the entire distance at a *fast* pace (14 minutes per mile)
6
7 I could jog the entire distance at a *slow* pace (12 minutes per mile)
8
9 I could jog the entire distance at a *medium* pace (10 minutes per mile)
10
11 I could jog the entire distance at a *fast* pace (8 minutes per mile)
12
13 I could run the entire distance at a *fast* pace (7 minutes per mile or less)

Note: If you are unfamiliar with pace times in minutes per mile, then use the other descriptive information to answer the question.

Select the number that best describes your overall level of physical activity for the previous 6 MONTHS:

0 = Avoid walking or exertion; e.g., always use elevator, drive when possible instead of walking

1 = **light activity:** walk for pleasure, routinely use stairs, occasionally exercise sufficiently to cause heavy breathing or perspiration

2 = **moderate activity:** 10 to 60 minutes per week of moderate activity; such as golf, horseback riding, calisthenics, table tennis, bowling, weight lifting, yard work, cleaning house, walking for exercise

3 = **moderate activity:** over 1 hour per week of moderate activity as described above

4 = **vigorous activity:** run less than 1 mile per week or spend less than 30 minutes per week in comparable activity such as running or jogging, lap swimming, cycling, rowing, aerobics, skipping rope, running in place, or engaging in vigorous aerobic-type activity such as soccer, basketball, tennis, racquetball, or handball

5 = **vigorous activity:** run 1 mile to less than 5 miles per week or spend 30 minutes to less than 60 minutes per week in comparable physical activity as described above

6 = **vigorous activity:** run 5 miles to less than 10 miles per week or spend 1 hour to less than 3 hours per week in comparable physical activity as described above

7 = **vigorous activity:** run 10 miles to less than 15 miles per week or spend 3 hours to less than 6 hours per week in comparable physical activity as described above

8 = **vigorous activity:** run 15 miles to less than 20 miles per week or spend 6 hours to less than 7 hours per week in comparable physical activity as described above

9 = **vigorous activity:** run 20 to 25 miles per week or spend 7 to 8 hours per week in comparable physical activity as described above

10 = **vigorous activity:** run over 25 miles per week or spend over 8 hours per week in comparable physical activity as described above

Appendix A-6

Fitness Assessment Recording Form

FITNESS ASSESSMENT

Subject # _____ Date _____

Age _____

Weight _____ lbs (1) BMI_____

Height _____ in (.5)

Waist Circumference _____ in (.5) Treadmill Walking Test

Hip Circumference _____ in (.5) target 50-70% Max HR_____

_____SPD _____HR

Hand Grip: Trial #1 R_____ L_____ _____ VO_2

#2 R_____ L_____

#3 R_____ L_____

FITNESS ASSESSMENT

Subject # _____ Date _____

Age _____

Weight _____ lbs (1) BMI_____

Height _____ in (.5)

Waist Circumference _____ in (.5) Treadmill Walking Test

Hip Circumference _____ in (.5) target 50-70% Max HR_____

_____SPD _____HR

Hand Grip: Trial #1 R_____ L_____ _____ VO_2

#2 R_____ L_____

#3 R_____ L_____

Appendix A-7

Payment Verification Form

Name_____

SS#_____

I received $10.00 for participating in a research study conducted by the Physical Education Department on _____.
Date

_____
Signature

Name_____

SS#_____

I received $10.00 for participating in a research study conducted by the Physical Education Department on _____.
Date

_____
Signature

Appendix B

Raw Data

The SAS System 12:00 Wednesday, June 10, 1998 215

OBS	ID	AGE	WTLBS	HTIN	BMI	WAIST	HIPIN	WTHIP	RGRP1	RGRP2	RGRP3	LGRP1	LGRP2	LGRP3	TMSPD	HRATE	VO2	PFAQ1	PFAQ2	PFAQ3	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
1	25	40	231	70.5	32.7	45.0	42.0	1.02	54	53	59	46	58	58	5.2	134	48.0	11	9	7	5	4	5	5	1	5	5	3	4	4	3	2	4	5	1
2	57	32	247	72.0	33.6	42.0	44.5	0.94	60	52	50	54	53	48	3.3	134	36.7	7	6	3	3	2	1	4	1	3	1	4	1	1	4	1	3	3	4
3	79	29	140	67.0	22.1	32.0	37.5	0.85	43	40	38	40	37	30	4.3	144	59.5	1	3	1	3	1	1	3	5	1	.	1	1	1	1	1	4	1	5
4	80	28	161	68.0	24.5	33.5	39.0	0.86	44	34	41	36	32	30	3.7	126	52.9	5	5	2	5	1	1	5	1	3	3	5	1	1	3	3	4	3	5
5	70	25	157	72.5	21.0	29.0	38.0	0.76	37	37	44	42	38	48	5.0	138	70.2	9	7	6	3	3	3	3	3	2	4	3	3	2	3	2	3	2	3
6	81	27	125	74.0	16.2	28.0	34.5	0.81	34	30	30	28	33	36	.	.	.	6	4	3	3	3	1	3	1	2	4	2	1	1	3	1	2	1	5
7	17	26	173	73.0	22.9	33.5	39.5	0.84	62	61	60	60	63	64	5.0	149	61.9	13	11	7	5	4	2	3	1	3	3	2	3	2	2	3	3	2	4
8	35	29	139	70.5	19.6	29.0	37.0	0.78	32	40	44	30	35	38	4.6	165	60.1	11	3	2	4	4	3	4	3	3	4	3	2	3	3	3	4	4	3
9	34	26	150	63.5	26.4	34.0	38.0	0.89	33	33	29	37	35	36	4.3	158	51.3	12	11	4	5	5	4	4	1	4	5	5	3	4	4	3	4	4	4
10	94	30	157	67.0	24.6	32.5	40.5	0.81	50	51	54	49	50	56	4.5	166	51.5	10	7	2	5	3	1	5	.	5	5	1	1	1	5	1	5	.	5
11	54	30	191	73.5	24.8	33.5	40.0	0.84	53	52	53	52	56	57	4.2	114	56.2	8	6	4	5	3	2	4	3	4	3	3	3	2	3	1	4	3	4
12	18	31	169	70.0	24.3	35.0	39.5	0.89	40	43	48	58	57	56	4.6	147	55.7	10	7	6	5	3	3	4	4	5	4	3	3	1	1	2	4	3	3
13	82	26	262	72.0	36.4	44.0	47.0	0.94	50	48	57	46	40	57	4.2	155	39.1	7	3	3	5	3	3	5	3	5	4	5	3	4	2	2	4	5	4
14	98	28	212	73.0	28.0	38.5	43.5	0.89	52	56	54	55	54	52	4.3	158	45.0	9	7	2	5	5	4	5	1	5	5	5	5	5	4	2	5	5	3
15	31	36	188	71.0	26.2	37.0	41.0	0.90	43	58	49	50	53	49	4.5	149	48.6	9	7	2	5	3	3	5	2	5	4	3	2	3	3	2	4	5	4
16	62	26	340	72.0	46.2	55.0	57.0	0.96	53	54	57	58	58	60	2.3	152	23.6	5	4	1	5	4	5	5	2	5	5	5	5	4	3	2	5	5	1
17	69	29	152	72.0	20.7	31.0	37.5	0.83	45	48	52	40	44	50	4.3	149	57.9	11	10	3	2	4	1	2	2	2	3	2	1	2	4	2	4	3	3
18	51	26	181	75.5	22.4	32.0	40.5	0.79	48	52	49	51	50	52	5.6	145	68.0	8	3	6	5	3	3	4	2	5	5	4	4	4	2	4	4	4	2
19	67	43	179	67.5	27.7	35.5	40.5	0.88	46	52	50	53	51	46	4.4	145	47.1	11	9	5	5	5	4	4	4	5	5	5	4	3	2	3	5	4	1
20	23	39	288	70.0	41.3	50.5	49.0	1.03	42	42	44	54	55	54	4.2	147	36.0	5	5	2	5	3	3	4	3	4	2	5	3	3	1	3	3	4	3
21	101	28	210	73.0	27.8	38.0	44.5	0.85	52	60	46	56	44	48	4.5	140	50.7	8	7	5	5	3	3	4	3	4	4	3	3	3	3	3	5	4	4
22	24	26	207	73.5	27.0	38.0	45.0	0.84	52	47	52	54	52	50	4.0	156	43.8	9	3	7	4	4	4	4	2	5	4	4	3	3	2	1	4	3	2
23	86	25	222	77.0	28.5	37.0	44.0	0.84	66	66	64	62	46	46	4.7	132	54.8	11	9	6	5	5	3	5	1	5	4	5	3	4	3	2	5	5	3
24	87	28	222	72.5	29.8	37.0	45.0	0.82	59	64	58	46	48	56	4.0	127	47.0	10	9	5	5	4	5	5	3	5	5	5	4	4	2	1	4	5	3
25	85	25	164	73.0	21.7	31.0	38.5	0.81	58	54	52	50	54	54	4.7	129	67.1	10	8	6	5	4	3	5	2	5	4	4	3	4	3	4	.	5	4
26	93	25	174	71.0	24.3	34.0	40.0	0.85	61	58	56	55	56	53	4.5	165	50.9	11	9	5	5	5	3	4	2	4	5	5	5	3	1	3	3	2	4
27	103	30	197	67.0	30.9	39.0	41.5	0.94	62	62	62	54	59	62	4.3	157	44.4	9	9		6	5	4	4	5	2	5	4	5	4	3	3	1	5	4
28	109	30	195	73.5	25.5	36.0	42.0	0.86	58	56	60	56	56	56	4.0	117	52.8	9	9		7	5	3	3	4	2	4	4	3	3	3	2	2	4	3
29	21	30	152	75.5	21.5	32.0	39.0	0.82	50	49	54	54	56	57	.	.	.	9	9		2	5	3	4	5	1	5	.	3	3	4	3	2	5	4
30	56	30	180	72.5	24.1	36.5	42.0	0.87	44	42	51	47	45	48	5.0	163	55.4	9	8		3	5	3	4	5	3	5	3	4	4	4	4	3	5	4
31	84	27	168	71.5	23.2	33.5	39.5	0.85	42	50	60	50	50	54	4.5	137	59.6	10	9		5	5	4	3	4	4	5	3	3	3	3	3	3	5	2
32	106	29	192	70.0	27.6	36.5	42.0	0.87	58	66	66	54	52	58	4.0	130	49.5	11	11		7	5	3	4	5	2	5	5	5	4	4	4	2	5	5

OBS		Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59	Q60	Q61	Q62	Q63	Q64	Q65
1		5	5	4	1	4	4	1	3	5	2	5	5	5	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	1	.	.	40	2	1	4	40	1	12	2	1	1	2
2		3	4	3	.	3	2	3	4	3	5	5	5	3	5	1	4	2	2	3	1	2	2	4	1	2	3	1	3	1	1	1	2	1	1	2	5	1	.	.	45	5	.	5	32	1	16	3			
3		1	1	1	1	4	1	1	5	1	5	5	1	1	3	1	5	4	4	4	4	4	4	3	2	2	2	2	1	2	1	1	1	1	1	2	7	2	3	.	.	5	2	5	29	1	12	2	2	2	2
4		5	5	3	.	5	3	3	1	3	3	3	1	1	5	1	1	2	4	4	2	1	2	3	2	2	2	2	3	1	1	1	1	1	1	2	7	1	.	.	40	6	2	5	28	1	9	2	2	2	1
5		3	2	3	.	4	2	3	3	2	3	3	5	3	3	1	4	3	4	4	3	1	3	3	2	2	2	2	2	2	1	2	2	1	1	2	7	1	.	.	20	5	.	5	25	1	12	3	2	2	2
6		3	3	4	.	4	2	4	2	3	5	.	.	.	.	2	5	4	4	4	4	4	4	4	1	2	3	2	3	1	1	1	2	1	1	2	3	2	3	.	.	1	1	5	27	1	12	2	2	1	2
7		4	4	3	.	5	2	3	2	1	4	3	3	2	5	2	4	3	4	4	4	4	3	4	1	1	3	1	3	1	1	1	3	1	1	2	4	1	.	.	38	5	.	5	26	1	16	3	1	1	1
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9		4	4	3	.	4	1	3	2	4	2	5	5	5	5	2	3	2	3	3	2	2	1	4	2	3	2	3	3	2	1	2	2	1	1	2	1	1	.	.	44	1	1	1	26	5	20	3	1	1	1
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11		4	2	3	2	3	3	2	3	4	2	5	5	5	5	2	3	2	3	3	2	1	1	5	1	1	3	1	2	1	1	1	2	1	3	2	4	1	.	.	55	1	1	2	30	1	15	2	2	2	2
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32	4	5	5	4	.	5	5	1	5	5	2	5	5	5	5	6	2	1	1	1	1	1	1	4	2	2	3	1	3	1	3	3	3	2	2	2	5	1	.	.	40	6	1	4	29	1	20	3	1	1	1

OBS	ID	AGE	WTLBS	HTIN	BMI	WAIST	HIP IN	WTHIP	RGRP1	RGRP2	RGRP3	LGRP1	LGRP2	LGRP3	TMSPD	HRATE	VO2	PFAQ1	PFAQ2	PFAQ3	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
33	110	25	208	68.0	31.6	39.5	44.0	0.89	54	54	52	60	55	54	4.0	155	41.7	7	7	6	5	4	5	5	2	.	4	5	4	4	4	3	5	5
34	26	31	208	74.5	26.4	38.0	43.0	0.88	61	55	58	50	54	52	4.5	156	47.8	3	1	1	5	4	3	3	4	5	4	5	4	2	1	2	4	3
35	58	33	196	69.5	28.7	38.0	43.0	0.88	51	49	45	54	58	55	4.2	130	49.0	9	9	3	5	3	3	5	4	5	4	5	4	3	3	2	4	4
36	76	25	238	73.0	31.4	41.5	46.5	0.89	49	42	45	41	43	51	4.8	162	45.6	8	7	5	5	4	3	5	1	5	5	4	2	3	3	1	5	5
37	104	26	155	71.0	21.7	32.0	38.0	0.84	41	46	48	35	36	34	4.0	128	59.8	11	9	7	5	3	3	5	2	5	4	5	4	3	3	3	5	4
38	29	27	158	71.5	21.7	33.0	39.0	0.85	72	70	66	53	52	52	4.0	155	51.2	10	7	4	5	3	4	5	2	5	4	4	3	4	3	2	4	3
39	65	39	184	67.5	28.4	39.0	42.0	0.93	39	40	36	38	36	37	4.2	147	45.8	3	3	1	5	4	3	4	3	4	4	3	3	3	3	2	4	4
40	90	25	160	72.0	21.7	34.5	38.0	0.91	46	52	66	42	44	44	4.5	150	59.0	9	9	7	5	4	3	5	2	5	5	5	4	4	4	3	5	5
41	96	25	268	75.0	33.6	44.5	47.0	0.95	50	43	48	46	42	41	4.2	135	43.4	9	9	3	5	4	5	5	3	5	3	5	3	4	3	2	5	5
42	99	32	203	71.0	28.4	39.0	43.0	0.91	45	.	.	24	.	.	4.1	122	49.5	9	9	6	5	5	5	5	5	5	4	5	4	5	4	1	5	5
43	105	30	165	69.0	24.4	31.5	38.5	0.82	.	.	.	38	45	42	4.5	133	58.7	10	8	9	5	4	3	5	4	5	4	5	3	3	3	1	5	5
44	6	28	185	69.5	27.0	35.0	41.0	0.85	58	52	60	65	60	59	4.8	160	52.0	9	8	3	5	5	5	5	1	5	5	5	4	5	3	1	5	5
45	20	29	176	70.5	24.9	34.0	40.5	0.84	49	53	49	40	39	38	4.5	144	54.7	13	11	7	5	3	4	5	2	5	5	5	5	3	4	2	5	5
46	27	28	127	67.0	19.9	28.5	35.5	0.80	38	48	46	40	43	43	4.6	148	67.5	12	11	9	5	4	4	5	3	5	3	5	5	5	2	3	5	5
47	33	40	176	71.0	24.6	36.0	39.0	0.92	46	64	62	45	49	54	4.0	129	47.1	11	9	5	5	5	4	5	3	5	4	5	5	5	3	3	5	5
48	36	34	177	70.0	25.4	36.5	42.0	0.87	50	54	47	46	43	46	4.5	162	49.4	7	5	2	5	5	3	4	2	5	5	5	4	3	3	3	4	4
49	38	25	200	74.0	25.7	36.0	42.0	0.86	48	54	50	56	49	54	5.4	160	57.8	12	12	7	5	4	5	5	3	5	5	5	5	5	4	2	5	5
50	39	31	180	68.5	27.0	33.0	40.0	0.83	56	71	71	50	56	57	4.7	163	50.3	5	7	9	5	3	3	5	1	5	5	5	4	5	4	2	5	5
51	42	34	176	70.5	25.1	35.0	39.5	0.89	46	52	48	52	52	44	5.0	150	56.4	11	10	7	5	2	4	5	2	5	3	2	3	3	2	2	4	3
52	45	36	211	74.0	27.1	39.0	43.0	0.91	46	50	52	.	.	.	4.2	158	43.9	7	7	1	5	3	4	5	3	5	5	5	5	3	4	2	4	4
53	48	25	202	71.5	28.0	35.5	42.0	0.85	54	60	61	55	60	62	2.9	113	43.1	9	7	8	5	4	4	5	3	5	4	5	4	5	4	3	4	5
54	73	32	267	76.0	32.5	46.0	48.0	0.96	49	55	53	50	43	48	4.5	144	42.9	8	3	4	5	3	3	5	3	5	3	5	3	3	3	1	5	4
55	74	35	165	67.0	25.9	32.5	39.5	0.82	51	51	45	40	42	46	4.4	147	51.7	9	3	5	5	3	3	5	3	5	3	4	3	3	3	2	4	3
56	91	25	209	72.5	28.0	38.5	42.5	0.91	50	54	52	42	50	46	4.5	140	51.6	11	9	6	5	4	.	5	2	5	5	5	5	5	4	1	5	5
57	1	40	155	69.5	22.4	34.0	38.5	0.88	52	50	50	38	42	40	4.7	154	55.7	8	7	8	5	4	2	5	2	5	3	5	3	4	4	2	5	5
58	5	31	209	69.0	30.9	40.5	43.0	0.94	52	60	60	45	47	43	4.0	148	42.6	10	9	6	5	4	3	5	4	5	4	5	4	4	3	2	5	4
59	7	30	181	71.0	25.3	35.5	41.0	0.87	40	45	51	50	51	52	4.7	146	55.1	10	9	6	5	4	4	4	2	5	4	5	3	4	2	1	4	5
60	10	30	206	73.0	27.2	39.0	42.5	0.92	48	44	44	43	44	.	4.8	139	53.5	11	3	5	5	4	3	5	2	5	5	5	3	4	3	3	5	5
61	16	25	210	73.0	27.8	38.5	42.5	0.91	59	50	49	44	46	40	4.5	168	45.2	9	4	1	5	3	3	5	1	5	5	5	5	4	4	3	5	5
62	32	32	152	70.5	21.5	30.5	38.0	0.80	43	38	39	33	28	41	4.6	143	60.9	13	13	10	5	5	4	5	2	5	5	5	4	4	4	2	5	5
63	43	34	135	71.5	18.1	30.0	36.0	0.83	30	26	35	29	30	31	5.0	150	71.7	9	9	0	5	3	4	5	2	5	4	5	3	4	4	2	4	5
64	60	31	168	72.5	22.5	34.5	39.0	0.88	53	49	49	56	54	50	4.3	152	53.0	7	3	1	5	4	4	5	2	5	4	5	3	4	4	2	5	5

OBS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45
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52	5	5	5	4	3	5	5	2	4	4	3	5	5	5	5	6	2	1	1	1	1	1	1	4	1	2	2	1	3	1	3	2	3	3	3	2	5	1	.	.	10	1	1	4	36	1	15	2	2	2	3
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56	1	5	5	4	1	5	5	1	5	5	2	5	5	5	5	6	2	1	1	1	1	1	1	4	1	1	3	1	3	1	3	2	3	2	3	2	5	1	.	.	20	1	1	2	25	1	15	3	1	1	2
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OBS	ID	AGES	WTLBS	HTIN	BMI	WAIST	HIPIN	WTHIP	RGRP1	RGRP2	RGRP3	LGRP1	LGRP2	LGRP3	TMSPD	HRATE	VO2	PFAQ1	PFAQ2	PFAQ3	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	
65	63	35	179	67.5	27.6	37.5	39.5	0.95	42	46	49	38	40	40	4.0	120	52.5	11	11	5	5	5	5	5	5	5	4	5	4	4	3	2	5	5	
66	66	28	232	73.5	30.4	41.0	45.0	0.91	51	56	45	44	50	48	4.0	132	45.1	5	5	3	5	4	4	4	2	5	3	5	3	4	3	3	4	4	
67	68	30	159	70.5	22.5	33.5	37.5	0.89	56	57	59	52	54	52	4.0	128	56.7	8	6	5	5	4	3	5	1	5	5	5	4	4	2	2	5	4	
68	71	25	234	74.5	29.6	40.0	47.0	0.85	42	42	43	51	41	43	4.1	140	45.3	11	9	7	5	4	3	4	1	5	3	5	4	4	3	2	4	5	
69	72	25	141	71.0	19.7	23.0	30.0	0.77	42	40	46	43	39	42	4.8	175	59.7	9	5	4	5	3	2	5	3	5	5	5	5	4	3	4	5	4	
70	78	25	155	69.0	22.9	32.0	39.0	0.82	35	38	42	36	36	36	4.5	153	57.7	12	10	8	5	4	3	5	5	5	5	5	5	4	4	2	5	5	
71	83	24	150	69.5	21.9	31.0	37.0	0.84	48	47	50	46	50	50	4.5	148	61.3	9	10	3	5	5	4	4	2	5	4	4	3	4	3	3	5	5	
72	88	26	146	72.5	19.6	31.0	36.5	0.86	50	50	50	44	42	42	4.7	150	65.7	9	6	3	5	4	5	5	2	5	5	5	4	4	3	3	4	5	
73	92	27	203	73.0	26.8	34.0	41.5	0.82	55	54	57	53	54	52	4.5	138	52.6	9	7	3	5	4	4	4	3	5	4	5	4	4	3	3	5	5	
74	102	44	199	70.0	28.5	37.0	41.5	0.89	53	56	56	54	53	56	3.8	122	42.9	9	7	5	5	4	3	4	2	5	4	5	3	4	3	2	5	4	
75	108	28	191	77.0	22.7	33.0	41.0	0.80	66	60	60	55	56	60	5.0	150	58.5	9	9	7	5	4	4	4	2	5	5	4	4	4	3	2	4	5	
76	2	40	190	73.5	24.7	34.5	41.5	0.83	54	52	46	52	54	51	4.6	140	49.4	10	7	10	5	4	4	5	2	5	4	5	3	5	4	2	5	5	
77	3	44	209	71.0	29.2	40.5	44.5	0.91	38	41	38	44	46	44	4.4	147	43.9	11	9	6	5	5	4	4	2	5	5	5	5	5	4	2	4	5	
78	4	37	189	68.0	28.8	39.5	43.5	0.91	54	56	58	49	48	46	5.0	147	51.9	8	7	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	
79	8	43	169	74.5	21.5	35.5	39.0	0.91	38	36	40	36	42	38	.	.	.	4	3	1	5	4	4	5	2	5	4	5	4	5	4	3	5	5	2
80	9	28	244	75.0	30.6	43.5	47.5	0.92	43	45	55	42	50	50	3.5	146	38.0	3	3	3	5	4	4	5	1	5	5	5	4	5	4	2	5	4	3
81	11	34	195	68.0	29.7	39.0	44.0	0.88	38	52	50	54	56	52	2.4	143	31.1	10	6	3	5	4	5	5	2	5	5	5	5	5	4	4	5	5	3
82	12	35	169	69.0	25.0	33.5	40.0	0.84	50	54	57	46	50	50	4.8	154	54.4	10	3	6	5	5	5	5	1	5	5	5	4	5	3	3	5	3	2
83	13	31	189	71.0	26.4	37.0	41.0	0.90	45	36	40	38	40	35	3.7	145	44.1	9	3	4	5	5	3	5	1	5	3	5	4	5	5	2	5	5	3
84	14	37	177	73.5	23.0	33.0	39.5	0.84	61	56	66	61	62	66	4.9	150	55.8	9	7	5	5	5	5	5	1	5	5	5	5	5	5	4	5	5	1
85	15	45	173	70.0	24.8	35.0	39.5	0.89	56	66	60	60	62	58	3.9	137	46.1	7	3	3	5	4	3	5	2	5	5	5	5	5	3	2	5	5	3
86	19	33	160	72.0	21.7	33.5	39.5	0.85	40	46	46	53	51	52	4.3	151	54.3	6	5	1	5	5	4	5	1	5	5	5	5	5	2	3	4	4	3
87	22	41	257	75.0	32.3	45.0	47.5	0.95	60	64	66	59	64	68	3.8	138	38.2	4	3	1	5	5	5	5	2	5	5	5	4	5	4	3	5	5	3
88	28	26	244	74.5	30.9	40.0	45.5	0.88	64	67	68	54	62	62	4.9	160	46.4	9	7	7	5	5	4	5	2	5	4	5	4	5	3	3	5	5	1
89	30	27	169	72.5	22.7	31.5	41.0	0.77	50	48	50	47	50	47	5.2	156	62.7	9	6	5	5	5	4	5	2	5	5	5	5	5	4	1	5	5	2
90	37	32	197	70.5	27.9	36.5	43.0	0.85	47	41	51	49	48	36	5.0	140	54.7	11	10	6	5	4	4	5	3	5	4	5	5	5	3	1	5	5	3
91	40	28	164	74.5	20.8	30.5	37.0	0.82	72	64	78	60	60	70	.	.	.	9	9	6	5	3	4	5	4	5	5	5	4	5	2	2	5	5	3
92	41	25	161	66.0	26.0	30.5	37.5	0.81	46	48	46	44	44	40	5.0	140	64.5	7	7	4	5	4	4	5	2	5	5	5	4	5	3	3	5	5	2
93	44	28	195	72.0	26.6	34.0	41.0	0.83	46	50	52	51	50	45	5.0	163	52.5	9	7	5	5	4	4	5	2	5	5	5	5	5	4	3	4	5	2
94	46	35	212	71.5	29.4	44.0	43.5	1.01	48	52	56	52	50	46	4.2	153	43.4	3	5	2	5	4	4	5	2	5	4	5	4	5	4	2	5	5	2
95	47	25	188	71.0	26.2	34.0	42.0	0.81	57	56	48	49	48	45	5.4	145	62.9	9	7	1	5	3	5	5	2	5	5	4	4	5	2	1	5	5	2
96	49	25	199	77.5	23.3	34.5	41.0	0.84	53	55	49	44	52	40	5.3	144	62.5	9	9	6	5	5	5	5	1	5	5	5	5	5	4	2	5	5	1

OBS	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59	Q60	Q61	Q62	Q63	Q64	Q65
65	2	5	5	4	2	4	5	1	5	5	2	5	5	5	5	6	2	1	1	1	1	1	1	5	2	1	3	1	3	1	3	2	2	3	3	2	5	1	.	.	60	2	1	4	35	1	17	2	2	1	1
66	3	5	3	3	3	3	3	2	4	4	3	5	5	5	5	6	2	1	2	1	1	1	1	5	1	1	3	1	3	1	3	2	2	3	3	2	5	1	.	.	60	1	1	4	28	1	14	3	2	2	2
67	2	4	5	3	1	5	5	1	4	5	2	5	5	5	5	6	2	1	1	1	1	1	1	4	1	2	2	1	2	1	3	2	3	3	3	2	5	1	.	.	40	1	1	4	30	1	19	3	2	2	2
68	2	5	5	3	.	4	4	1	4	4	3	5	5	5	5	6	2	1	1	1	1	1	1	4	1	2	3	1	3	1	3	2	2	3	3	2	5	1	.	.	55	1	1	4	25	1	14	3	1	1	2
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73	3	4	5	3	2	4	4	3	4	5	3	5	5	5	5	6	1	1	1	1	1	2	1	3	2	2	2	2	3	1	3	2	3	3	3	2	5	1	.	.	30	1	1	4	27	1	15	2	2	2	2
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75	3	4	4	4	.	4	4	1	4	4	2	5	5	5	5	6	2	1	1	1	1	1	1	4	2	1	3	1	3	1	3	3	3	3	3	2	5	1	.	.	18	5	.	5	28	1	17	3	1	1	1
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77	3	5	5	4	3	5	4	2	4	4	2	5	5	5	5	6	2	1	1	1	1	1	1	4	2	2	3	1	3	1	3	2	3	3	3	2	6	1	.	.	50	1	1	4	44	1	17	3	1	1	1
78	3	5	5	4	3	5	5	1	5	5	2	5	5	5	5	6	2	1	1	1	1	1	1	5	1	1	3	1	3	1	3	2	3	3	3	2	5	1	.	.	60	1	1	4	37	1	14	2	1	1	1
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80	5	5	4	2	4	4	1	4	4	2	5	5	5	5	6	2	1	1	1	1	1	1	5	2	1	3	1	3	1	3	3	3	3	3	2	5	1	.	.	40	1	1	4	28	1	16	3	2	1	1	
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92	5	5	3	.	5	5	2	4	5	2	5	5	5	5	6	1	1	1	1	1	1	1	4	2	2	3	1	2	1	3	2	3	3	3	2	5	1	.	.	19	5	.	5	25	4	15	2	2	1	1	
93	5	5	4	.	5	5	1	4	5	1	5	5	5	5	6	2	1	1	1	1	1	1	4	1	1	3	1	3	1	3	2	2	3	3	2	5	1	.	.	50	5	.	5	28	1	16	3	2	1	2	
94	5	3	4	1	4	4	1	4	5	3	5	5	5	5	6	2	1	1	1	1	1	1	4	1	1	3	1	2	1	3	2	3	3	3	2	5	1	.	.	60	1	1	4	35	1	17	3	2	2	1	
95	5	5	4	.	5	5	1	4	5	1	5	5	5	5	6	1	1	1	1	1	1	1	4	1	2	2	2	2	1	3	3	3	3	3	2	5	1	.	.	27	5	.	5	25	1	14	3	2	2	2	
96	5	5	4	.	5	5	1	5	5	2	5	5	5	5	6	1	1	1	1	1	1	1	3	2	2	3	2	3	1	3	3	3	3	3	2	5	1	.	.	45	1	1	4	25	1	14	3	1	1	1	

OBS	ID	AGE	WTLBS	HTIN	BMI	WAIST	HIPIN	WTHIP	RGRP1	RGRP2	RGRP3	LGRP1	LGRP2	LGRP3	TMSPD	HRATE	VO2	PFAQ1	PFAQ2	PFAQ3	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
97	50	44	182	72.0	24.9	36.5	40.0	0.91	42	48	46	42	42	39	4.7	145	50.2	7	5	7	5	4	3	5	1	5	5	5	5	5	3	2	5	5	1
98	52	27	189	72.0	26.2	35.0	41.0	0.85	40	47	47	49	49	50	2.9	116	43.7	9	7	3	5	4	4	5	2	5	5	5	4	5	3	1	5	5	2
99	53	26	183	71.5	25.2	34.5	40.0	0.86	47	48	51	51	51	56	4.2	126	56.2	11	8	6	5	4	4	5	1	5	5	5	4	5	4	3	5	5	1
100	55	31	181	73.0	23.9	32.5	42.0	0.77	46	45	42	42	35	42	4.8	168	52.3	10	10	6	5	5	5	5	5	5	4	5	5	5	4	1	5	5	3
101	59	26	176	66.0	28.5	35.0	41.0	0.85	44	46	44	49	52	50	4.0	146	47.4	7	6	6	5	5	4	5	1	5	3	5	4	5	4	3	5	4	2
102	61	26	150	69.0	22.2	32.0	36.5	0.88	49	44	44	48	42	47	4.0	141	56.1	9	8	3	5	4	5	5	3	5	4	4	5	5	5	3	5	4	3
103	64	40	300	75.0	37.6	51.0	47.5	1.07	61	62	61	73	71	73	.	.	.	5	5	4	5	5	5	5	4	5	5	5	4	5	4	2	5	5	2
104	75	45	233	71.0	32.6	42.0	44.5	0.94	36	47	46	38	38	45	4.0	140	39.2	8	6	3	5	5	4	5	2	5	4	5	5	5	4	2	5	5	1
105	77	25	174	71.0	24.2	28.0	39.5	0.71	44	45	43	38	42	44	5.0	145	62.2	12	9	2	5	4	5	5	1	5	4	5	5	5	5	3	5	5	5
106	89	25	166	71.0	23.2	32.5	37.5	0.87	44	56	58	30	36	42	4.5	133	61.9	12	12	7	5	5	4	5	1	5	.	5	4	5	3	2	5	4	3
107	95	24	124	65.0	20.7	28.0	35.5	0.79	42	38	44	40	45	48	4.5	178	55.4	8	8	1	5	5	5	5	1	5	4	5	5	5	3	2	5	5	1
108	97	25	261	73.0	34.5	44.5	47.0	0.95	66	70	68	70	68	68	3.8	153	37.1	7	6	3	5	5	5	5	1	5	5	5	5	5	5	3	5	5	2
109	100	26	166	70.0	23.9	31.0	37.0	0.84	50	54	58	50	50	52	4.5	147	57.0	11	9	4	5	5	4	5	3	5	5	5	4	5	4	3	5	5	2
110	107	24	175	70.5	24.8	32.0	39.5	0.81	33	31	36	39	36	37	4.5	128	61.1	12	11	7	5	5	4	5	4	5	4	5	5	5	3	3	5	5	3

OBS	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59	Q60	Q61	Q62	Q63	Q64	Q65
97	5	5	4	4	5	5	1	4	5	2	5	5	5	5	6	2	1	1	1	1	1	1	5	1	1	3	1	3	1	3	3	3	3	3	2	6	1	.	.	50	1	1	4	44	1	19	2	1	1	1
98	5	5	3	.	4	5	1	5	5	1	5	5	5	5	6	2	1	1	1	1	1	1	4	1	1	3	1	3	1	3	2	2	3	3	2	5	1	.	.	40	1	1	4	27	1	15	3	2	2	2
99	5	5	5	.	5	5	1	4	5	2	5	5	5	5	6	2	1	1	1	1	1	1	5	2	2	3	2	3	1	3	3	3	3	3	2	5	1	.	.	20	5	.	5	26	1	16	2	1	1	1
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104	5	5	4	2	4	5	1	5	5	2	5	5	5	5	6	2	1	1	1	1	1	1	5	1	1	3	1	3	1	3	3	3	3	3	2	6	1	.	.	50	1	1	4	45	1	16	2	1	1	1
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109	5	5	4	.	5	5	1	5	5	2	5	5	5	5	6	1	1	1	1	1	1	1	5	1	1	2	1	1	1	3	3	3	3	3	2	5	1	.	.	15	5	.	5	26	1	12	2	2	1	1
110	5	5	4	.	5	5	1	4	5	2	5	5	5	5	6	1	1	1	1	1	1	1	4	2	2	3	1	3	1	3	3	3	3	3	2	5	1	.	.	5	1	1	4	24	1	15	3	1	1	1