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**A STUDY TO DETERMINE THE EFFECTS
OF CHANGES IN ROUTINE ON
AEROBIC PARTICIPANTS**

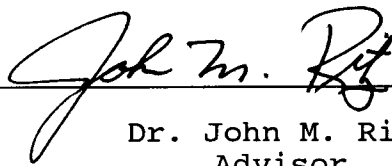
**A RESEARCH PROJECT
PRESENTED TO
THE FACULTY OF THE GRADUATE SCHOOL
OLD DOMINION UNIVERSITY**

**IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE
MASTER OF SCIENCE IN EDUCATION**

**By
Andrea G. Oberg
August, 1992**

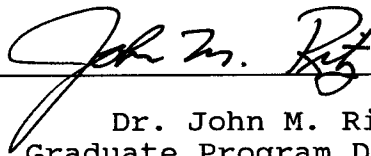
This project was prepared by Andrea G. Oberg under the direction of Dr. John M. Ritz in VTE 636, Problems in Education. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Master of Science in Education degree.

APPROVED BY:



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CHAPTER 1

INTRODUCTION

Physical fitness is a greater concern of today's society. There are many types of activities and sports that are included in physical fitness programs. One of the most popular type of physical fitness program is aerobic dance. Aerobic dance was developed by Dr. Cooper in the late 1960's. Aerobic, meaning with oxygen, includes such activities as jogging, swimming, aerobic dance, etc. (Hobson and Robinson, 1987, p.2).

Aerobic exercise improves the cardiovascular system which is made up of the heart (cardio) and lungs (respiratory). These two systems depend upon one another at rest and especially during exercise. Because coronary heart disease is so prevalent, this system receives much public attention. Aerobic dance has been associated with decreasing the risk of heart disease (Wilmoth, 1986, p.9).

Besides being a help with a decreased risk of heart disease, aerobic dance will help a person feel better about oneself through motivation, energy and mental attitude. "How sweet it is" to have something that is enjoyable and at the same time helping the cardiovascular system, muscle strength, nervous system and energy level (Wilmoth, 1986, p.30). Aerobics can lead to a more productive way of life and increase inner strength and stability.

STATEMENT OF THE PROBLEM

The problem of this study was to determine the effects of changes in routine on aerobic participants. It led to the development of the following hypothesis.

HYPOTHESIS

H₁: When knowing the routine, aerobic participants will receive a more effective workout than when the routine is unknown.

BACKGROUND AND SIGNIFICANCE

Because people of today's society are more conscious of their health, participation in physical exercise has increased. A 1984 survey indicated that approximately 50 percent of the adult population engaged in some type of physical exercise (Hobson and Robinson, 1987 p.1). Today the percentage of participation has increased to nearly 61 percent.

In relation to physical fitness, an aerobic fitness is relatively new. Americans of all ages and backgrounds choose aerobic type exercise as their form of physical activity. Aerobic type exercise includes any activity that is a prolonged, rhythmical exercise such as walking, jogging, swimming, cycling, hiking, dance and many others.

Many people choose to participate in an aerobic dance program as their form of physical exercise. Almost anyone can engage in

aerobic dance. No matter what age, color, size or shape, aerobic dance provides an atmosphere in which both men and women can workout together in a non-competitive environment (Hobson and Robinson, 1987, P.1).

Aerobic exercise was founded in the late 1960's by Dr. Kenneth Cooper. Dr. Cooper developed a new approach to fitness based on the needs of military personnel. From this basis, aerobic dance was derived (Hobson and Robinson, 1987, p.2).

The word aerobic means with oxygen. Aerobic exercises are those exercises which demand oxygen without increased oxygen debt. Here the exercise can be continued for long periods of time (Cooper, 1968, p.39). Aerobics improves the body's capability of bringing in and delivering oxygen to the blood cells. Here the oxygen is combined with "foodstuffs" to produce energy (Cooper, 1968, p.39). In other words, aerobics increases oxygen consumption and, therefore, endurance capacity.

In order for an aerobic class to be effective, participants must maintain a heart rate level that is within their heart rate training zone. The heart rate training zone is found by using the following three steps:

1. $220 \text{ (highest attainable heart rate)} - \text{Age} = \text{Age Predicted Maximum Heart Rate (APMHR)}$
2. $\text{APMHR} - \text{Resting Heart Rate} = \text{Heart Rate Reserve}$
3. $\text{Heart Rate Reserve} \times 0.70 + \text{Resting Heart Rate} = \text{Minimum Workout Heart Rate}$

Heart Rate Reserve x 0.90 + Resting Heart Rate =
Maximum Workout Heart Rate

Note: The two numbers found in step three give the range of the Heart Rate Training Zone (Ashton and Davis, 1986, p.130).

Little, if any, research shows which form of aerobic dance class is more effective, known or unknown. In this research, this factor was determined.

LIMITATIONS

This research study was limited to the aerobic dance classes at the YMCA in Portsmouth, Virginia. Also limiting the study was the fact that people have "good" and "bad" days. For example, aerobic participants could perform and concentrate some days better than others.

ASSUMPTIONS

The researcher of this study assumes that there is a significant difference in the heart rate of the aerobic participants pertaining to the known routine versus the unknown routine. The researcher also assumes that the known routine will give the participants a more significant workout rather than the unknown routine.

PROCEDURES

Subjects for this study were active participants in three aerobic classes held at the YMCA in Portsmouth, Virginia. The heart rates from the known routine and the unknown routine of these participants in the selected classes were monitored, recorded and compared. Using this data, it was determined which routine, known or unknown, gave the participants a more effective workout.

DEFINITION OF TERMS

To assist the reader's comprehension of this research, terms frequently used in this study are listed and defined as follows:

Term	Definition
Aerobic	Any activity performed using sufficient amounts of oxygen.
Aerobic Dance	A combination of blended movements, different types of exercise, vigorous activity such as jogging and forms of dance such as jazz. These movements are sometimes preplanned and set to music.
Age Predicted Maximum Heart Rate	The difference between the highest attainable heart rate (220) and the age of the participant.
Heart Rate	The number of times the heart beats in a minute.
Heart Rate Reserve	The difference between the resting heart rate and the age predicted maximum heart rate

(APMHR) .

**Heart Rate Training
Zone**

The maximum and the minimum heart rate a participant wants to maintain during an aerobic workout.

Resting Heart Rate

The heart rate during rest, i.e. before bed.

SUMMARY

The problem and hypothesis of this research study were identified in Chapter I. The problem of this research study was to determine the effects of changes in routine on aerobic participants. Also included in Chapter I was the background and significance, limitations, assumptions and procedures of the study. A definition of terms frequently used in the study was also given to assist the reader's understanding.

In Chapter II of this research study a thorough review of the available literature pertaining to the research problem will be discussed. The relevant data collected will be explained in detail to give further knowledge on the topic being researched. Chapter III will include the methods and procedures used to perform this experiment. The results (findings) of the experiment will be discussed in Chapter IV. In the final chapter of this study, Chapter V, summaries, conclusions and recommendations are given.

CHAPTER II

REVIEW OF LITERATURE

Aerobic dance programs involve a large variety of people. Participants are of different age, size, color, health, etc. Chapter II will discuss aerobic dance. The topics discussed in this chapter include Definition of Aerobics, History of Aerobics, Aerobics Today, A Successful Workout, The Heart Rate and Summary.

Being a type of physical fitness, aerobics has many benefits. It is important to understand all aspects of aerobics before engaging in a program. Some initial considerations that need to be taken include the following:

- * Find out if the instructor is certified by IDEA (International Dance Exercise Association) and had training and certification in CPR (cardiopulmonary resuscitation.)
- * Check the class size. Popularity is often an indicator of the instructor's quality. If the class is mobbed, the instructor is probably very good.
- * Observe the class before signing up. Make sure the instructor's style does not differ from your own.
- * The instructor should give and be able to impart knowledge of nutrition. Aerobics are an ideal way to loose weight. The instructor should be qualified to give advice in this regard.
- * The instructor should change the music, exercise and pace of the class to avoid boredom.

- * An instructor should be concerned with providing safe as well as productive workouts.
- * The participant having a health history should consult a physician before engaging in any aerobic workout. (New York Times, July 10, 1989. B:11)

DEFINITION OF AEROBICS

Aerobics is a form of physical fitness. The word fitness in physical fitness can be a very confusing term. To some people fitness indicates freedom from disease. As an essential element, some include psychological well-being. Still some measure fitness by proficiency in weight-lifting, aerobic dance, gymnastics, boxing or skiing, by agility or by the degree of muscular development present. In all views, "fitness is a desirable state for anyone who wants to lead a zestful and productive life and realize his fullest potential" (Cooper, 1968, p.10). Yet to be more concise, fitness includes muscular development, functional and flexible joints, adequate vital capacity of the lungs, reserve capacity of the heart and blood vessels and stamina, the capacity to endure exertion and stressful physical activity (Cooper, 1986, p.11).

Literally, the word aerobics means with oxygen. Aerobics are the foundation exercises on which every exercise program should be built. Because of demanding oxygen without producing an intolerable oxygen debt, aerobics can be continued for long periods of time. In doing this, the training effects are activated, producing changes in the body.

With aerobic exercise, the lungs begin processing more air

with less effort, the heart grows stronger (pumps more blood with fewer beats/strokes), the blood supply to the muscles improves and the total blood volume increases (Cooper, 1986, p.13). Altogether, this means that the oxygen consumption is being increased, therefore increasing the endurance capacity. In totality, aerobics develops a stronger more productive cardiovascular system.

Aerobic exercises include not only physiological benefits, but also psychological and sociological benefits. Following is a list of benefits of aerobic exercises:

- * Decreased chances of developing cardiovascular diseases
- * Improved work efficiency of the heart and lungs
- * Increase in the stroke volume of the heart
- * Improved blood circulation
- * Increased vital capacity of the lungs
- * Decrease in resting heart rate
- * Improved recovery period
- * Development of a stronger heart muscle
- * Muscles become lean, supple, toned, stronger and more efficient
- * Improved strength and muscular endurance
- * Improved flexibility, balance and coordination
- * Decrease in the aging process
- * Decrease in the development of osteoporosis (brittle bones)
- * Greater chance of weight loss
- * Increase in calorie expenditure
- * Improved appearance
- * Decrease in appetite satisfaction
- * Reduction of stress and fatigue
- * Reduced mental tension
- * Opportunity for successful experiences
- * Opportunities for greater personal interaction
- * Greater efficiency during work and leisure (Hobson and Robinson, 1987, p.4)

HISTORY OF AEROBICS

Dr. Kenneth Cooper, a former lieutenant colonel in the medical corps of the United States Air Force and senior flight surgeon, developed a program based on the needs of military personnel and established a new approach to fitness in the late 1960's. Due to this program, Dr. Cooper founded aerobic exercise which originated shortly after his military program.

In 1969, Jackie Sorensen originated aerobic dance. Aerobic dance evolved from a military assignment in Puerto Rico in which a television fitness program for the Air Force officer wives was developed.

Sorensen used certain guidelines and benefits which need to be kept in mind when performing all aerobic exercised as well as three specific realms. These three specific realms are as follows:

1. The activity must utilize the large organs of the body such as the heart and lungs.
2. The activity must be rhythmic and continuous.
3. The activity must be performed at a submaximum level of intensity.
(Hobson and Robinson, 1987, p.2)

These guidelines and realms were used by Sorensen in a combination of blended movements, different types of exercises, vigorous activity such as jogging and forms of dance such as jazz and folk, sometimes with preplanned choreography and set to music. This exercise combination is known as **aerobic dance**.

Aerobic dance involves movements which require large quantities of oxygen for long periods of time. This eventually

forces the body to develop those systems responsible for delivering the oxygen to vital organs of the body (Hobson and Robinson, 1987, p.2). Some examples of activities which are aerobic in nature include swimming, brisk walking, cross-country skiing, jogging, jump-roping and dance.

Because aerobic dance contains a variation of movements, music and motion, many people enroll in aerobic dance classes. An associate editor of Consumers Research, Karen Lehrman stated that some 18.7 million people enrolled in aerobic dance classes in 1985 (Hobson and Robinson, 1987, p. 1). In 1986, an estimated 22 million people participated in aerobic dance exercise (Wilmoth, 1986, p.2). Although many basic principle still apply, aerobic dance exercise is increasingly growing, changing and becoming more competitive.

AEROBIC DANCE TODAY

Today over 24 million people participate in aerobic dance exercise. Aerobic exercise has grown beyond just physical fitness; aerobic exercise has become a competitive sport. According to the United States Aerobic Federation, 10,000 participants of aerobic exercise engage in the competitive sport (New York Times, July 10, 1989, B:11). In competitive aerobics, performers are judged on three-minute routines including jumping jacks, leg kicks and strength and flexibility movements set to music.

"The public in 1984 didn't really have a concept of what aerobics was," said Schwartz, producer of sporting events. "So the

last thing that we wanted to do was seclude ourselves in a venue where the people couldn't see what we were up to. So we decided to hold the competition in the malls around the country" (New York Times, July 10, 1989, B:11).

Holding aerobic competition in the malls was a great development and opened many new doors for aerobic dance. Another new development in aerobic dance was Step Aerobics. This consists of using a step, usually about four inches, in the routine with which to step up and down, on and off adding resistance (New York Times Magazine, September 2, 1990, p.49).

Although there have been many new changes and advances in aerobic dance, the components of an aerobic dance program are the same as they were five years ago, but they have changed only slightly in order and movement. These components are as follows:

1. Warm-up Component
2. Stretching Component (flexibility)
3. Aerobic Dance Activity
4. Cool-down Component

In an aerobic dance program the **warm-up component** is designed to increase the blood circulation throughout the body and to the working muscles. Here the body begins to warm up, the resting heart rate increases slightly and the lungs expand, preparing to take in more oxygen. The warm-up consists of easy continuous movements of the arms, legs and body. It is important to perform the warm-up component first in order to prepare the body for components two and three.

In component two of an aerobic dance program, the **stretching component**, flexibility is enhanced. Flexibility refers to the range of movement available in a joint/muscle, tendon/ligament. Not only increasing the range of movement, flexibility helps the performance in an aerobic dance class.

The third and most vigorous component, **aerobic dance activity**, may be classified as low impact, maintaining one foot on the floor at all times, or high impact, both feet come off the floor. There are some guidelines which must be used in order for this activity to be considered aerobic. They are as follows:

The activity must:

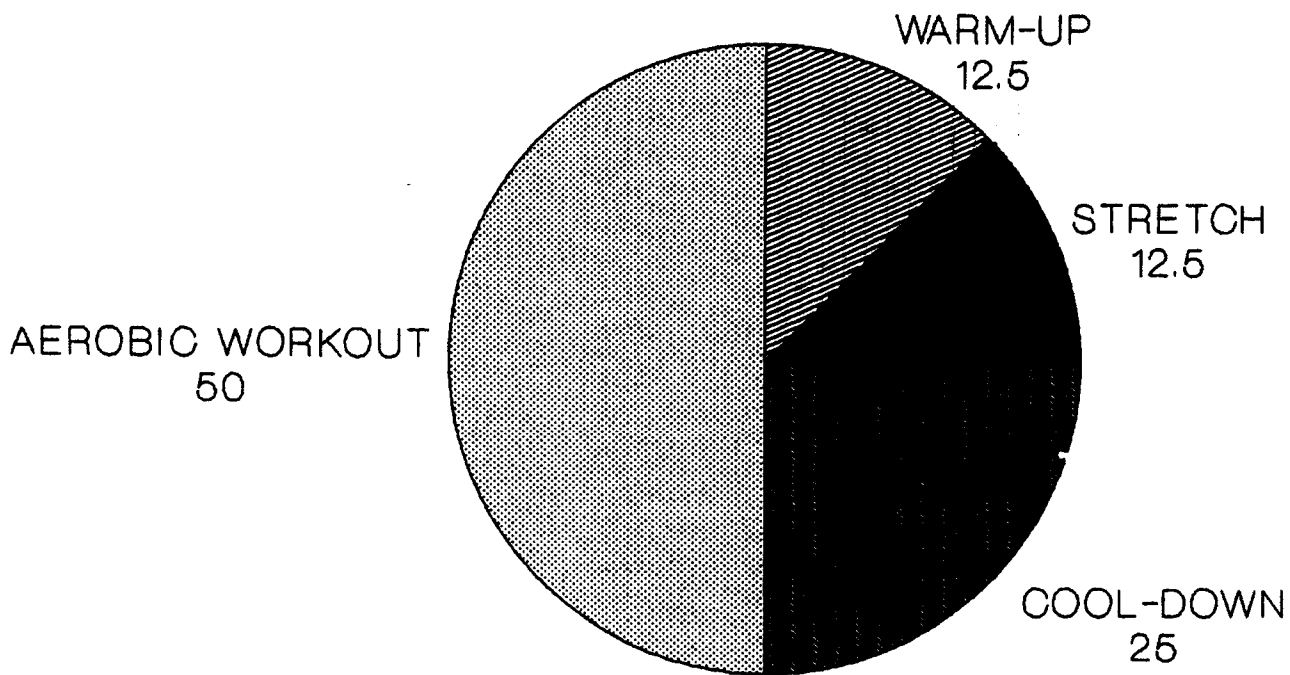
1. be rhythmic and continuous.
2. be performed for at least 20 minutes.
3. utilize the large muscles of the body.
4. be performed at a sub-maximum level of intensity of 70% - 90% of the participants' maximum capacity.
5. use music that consists of 120 - 160 beats per minute allowing for moderate to vigorous movement and also the aerobic level, high or low impact.
(Hobson and Rovinson, 1987, p.40)

Finally, the **cool-down component**, like the warm-up, consists of easy continuous movements. But in the final component these movements are used to return the heart rate to a rate slightly above the resting heart rate (same rate as in the warm-up). Once the heart rate is decreased, stretching and other exercises such as stomach, inner and outer thigh and hip exercises may be performed.

Each component makes up a percentage of an aerobic dance program. They need to be coordinated and preplanned in such a way so that the transition from one component into another is smooth and also allotted an appropriate amount of time. Figure 1 is a pie

FIGURE 1

AEROBIC DANCE A 60 MINUTE SESSION



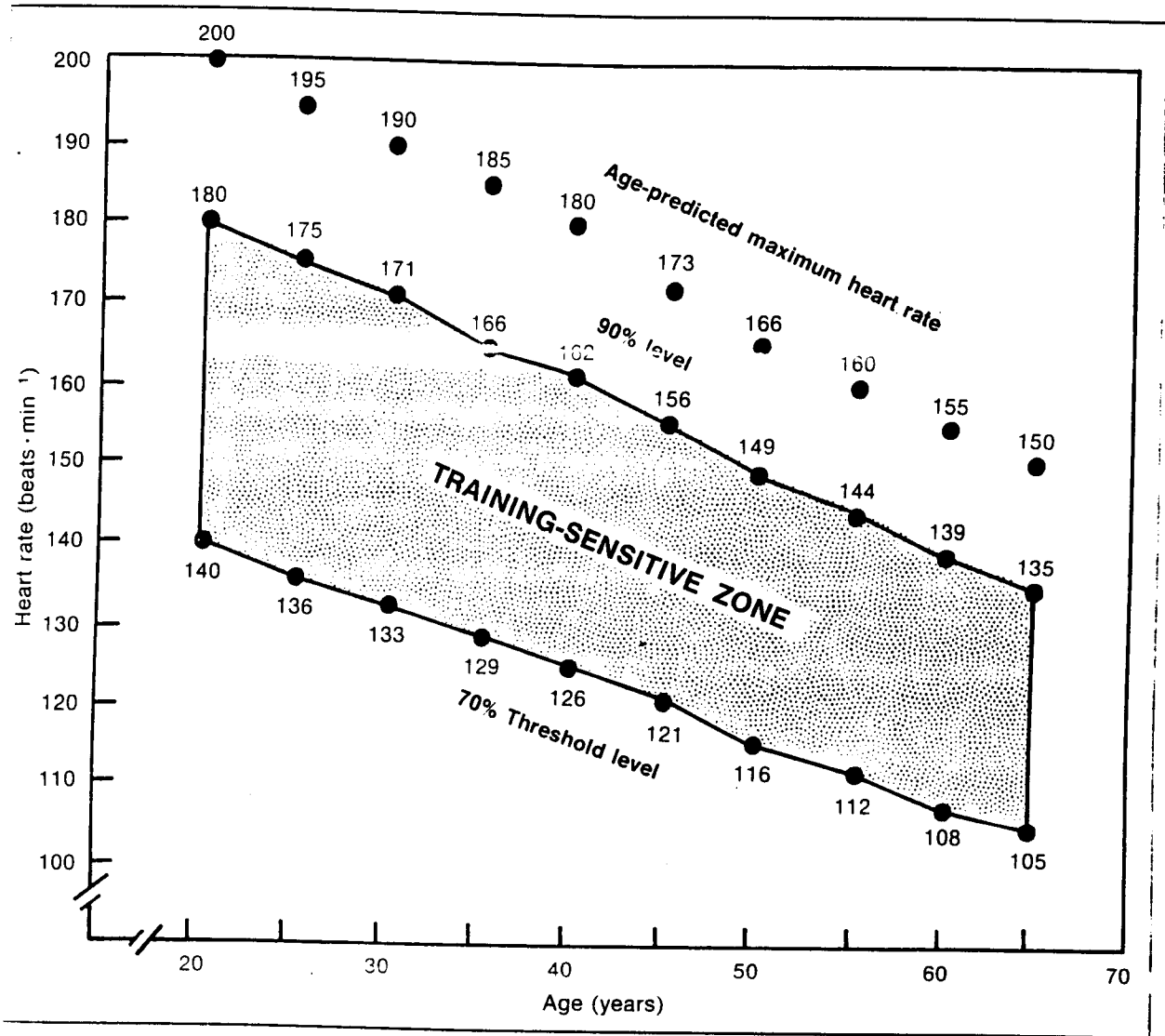
graph which shows the percentage of each component in a 60 minute aerobic dance class.

A SUCCESSFUL WORKOUT

As stated previously, an aerobic workout helps to increase the efficiency of the cardiovascular system, the heart (cardio) and the lungs (respiratory). There are seven principles which are used to meet the needs for establishing an effective aerobic dance program.

First, aerobic dance training for endurance of the cardiovascular system is established by determining the minimal level at which the heart can work efficiently during aerobic activity for physiological benefits. This is otherwise known as the threshold of training. The training threshold is at least 70 percent of the maximum heart rate level. As there is a minimum heart rate level, there is a maximum heart rate level at which the heart must beat for physiological benefits to be obtained (Hobson and Robinson, 1987, p.5). The maximum level is 90 percent of the maximum heart rate. The minimum and maximum levels are referred to as the **training zone** in which a participant should maintain during the aerobic dance activity (see Table 1). The heart rate must be elevated during the aerobic dance activity in order to reach the maximum level of the training zone. The training zone and the elevation of the heart rate for an individual depends on the individual's age, initial physical fitness level and the maximum heart rate. The highest attainable heart rate for one's age can be determined by the heart rate training zone steps discussed in

TABLE 1
HEART RATE TRAINING ZONE



Chapter I. This includes the participants age, APMHR (Age Predicted Maximum Heart Rate) and the Resting Heart Rate.

The second principle, applying Frequency, Intensity and Time (F.I.T.), is important to the design of an aerobic dance routine because it helps establish boundaries to maintain while participating in the exercise program. Table 2 shows how these boundaries work (Hobson and Robinson, 1987, p.8).

Minimum and Maximum Zone for Aerobic Dance

	Minimum	Maximum
<u>F</u>requency	3 days per week	5 days per week
<u>I</u>ntensity	70% of MHR	90% of MHR
<u>T</u>ime	20 continuous minutes	60 continuous minutes

Table 2

Overloading, the third principle, refers to the physical changes that take place as a result of a greater than normal resistance to muscles. For aerobic dance, overload can be accomplished by altering either the frequency, intensity or time. Examples of overloading in an aerobic dance workout would include using one to three pound hand or leg weights, increasing the number of days an individual exercises per week from three to four or exercising for 50 minutes instead of the normal 30 minutes.

The next two principles, progression and individuality, work together gradually increasing the overload on an individual basis within an aerobic dance program. The individual is important in a program because everyone does not progress at the same rate or even begin on the same level.

Specificity, the sixth principle, refers to focusing on the development of particular muscles. Aerobic dance is designed in such a way so that a particular muscle or muscle group may be the center focus of an exercise. Such muscles or muscle groups include the legs, arms, hips, stomach, etc.

Finally, Consistency relates to the regularity of an exercise program. This also includes making sure that the other six principles are included in every workout. Failing to progress toward a consistent overloading program may result in a decrease of physiological benefits that are desired from participation. A continuous participation of about six to eight weeks in an aerobic program is necessary in order for changes to occur.

THE HEART RATE

In an aerobic dance class, the effectiveness is measured with a periodical check of the heart rate. Depending on the age of the individual and other factors discussed earlier, the maximum and minimum heart rate that should be maintained during an aerobic workout needs to be monitored. A heart rate check should be taken after the stretching component of an aerobic dance program, mid-way to the peak of activity, at the peak of activity (maximum level)

and after the cool-down which should match the beginning heart rate plus or minus two.

The heart rate training zone is a vital factor in an aerobic dance workout. It can be calculated by using the formula discussed in Chapter I or by using Table 1. To maintain an aerobic workout, the heart rate must remain within the individual's training zone. If outside of the training zone, the individual is not receiving an aerobic workout but an anaerobic workout. Anaerobics, literally meaning without oxygen, "fall into two classes, those that demand oxygen but are cut short voluntarily and those that demand exorbitant amounts of oxygen and are cut off short involuntarily" (Cooper, 1968, p.38). This type of workout produces a strain which the body cannot tolerate.

SUMMARY

Because aerobic exercise is important to numerous people and is popular among all people, an understanding of the concept behind aerobic exercise is also important. As discussed in this chapter, aerobic dance provides many benefits to its participants and is fun at the same time. Dr. Cooper stated that a maintained exercise is "one essential that not only helps enjoy the life you have, but can help you to have more life to enjoy" (Cooper, 1968, p.224).

In the following chapter, Chapter III, the methods and procedures used in the research study will be discussed. This includes the population, research variables, instrument design, reliability and methods of data collection.

CHAPTER III

METHODS AND PROCEDURES

The problem of this study was to determine the effects of changes in routine on aerobic participants. Chapter III will discuss the methods and procedures used in determining the effects that the change in routine causes on aerobic participants. Essential information pertaining to the population used in this study will be explained. Other pertinent information explaining the research variables, instrument design, reliability, methods of data collection and data analysis will be discussed.

POPULATION

The population of this study consists of approximately four hundred twenty (420) summer aerobic participants of the YMCA, Portsmouth, Virginia. This population was made up of 90 percent female and 10 percent male. Ages of these participants varied between 20 - 65. A breakdown of participants in each age group is as follows:

<u>Age Group</u>	<u>Number of Participants</u>
20 - 30	30%
31 - 40	40%
41 - 50	20%
51 - 65	10%

A stratified sample of the population was used in this study. Using 20 percent of the entire population gave 84 aerobic participants to use for this study. The stratified sample consisted of the following:

<u>Category</u>	<u>Number of Participants</u>
Male	08
Female	76
<u>Age</u>	
20 -30	25
31 - 40	34
41 - 50	17
51 - 65	08

The above comprises the sample used in this experimental study. These participants, making up the stratified sample, were divided into two groups, a control group and an experimental group, each group consisting of forty two (42) participants. The participants in the control group were taught a routine that is known to each participant throughout the experiment. The experimental group was taught the same known routine as the control group for several classes and then the experimental group was taught an unknown routine.

RESEARCH VARIABLES

Those variables used in this research study were the heart rates of those in the control group and the heart rates from the

unknown routine of those in the experimental group. The heart rates using the known aerobic routine and the unknown aerobic routine of the control and experimental group were used in this research study. The heart rates were compared using the t-test.

EXPERIMENTAL PROCEDURES

By using the heart rates of the control group and the experimental group with the known aerobic routine and with the unknown aerobic routine, the effects were measurable.

Internal Validity

Testing: The experimental group of aerobic participants did not know the routine was going to be changed. Therefore, the participants did not know what was being tested and could not have been biased.

Selection: The selection of the experimental group was done so that the whole population was represented. Each experimental participant was unaware of who the other experimental participants were, therefore, they could not be influenced by one another.

Instrumentation: Because the experiment took place in the normal everyday aerobic class setting and all the experimental participants were familiar with the class setting, the situation was valid.

External Validity

There were four certified aerobic instructors taking part in this experiment. Each instructor collected the data in her class

for 23 or 24 participants of the experimental group.

Selection Biases: Because there were four instructors collecting the data in her class and were given the number of males, females and age group of the participants selected, there was not any selection biases.

Experimental Procedures: The procedures were outlined for each instructor and were followed. The procedures were controlled and succeeded.

DATA COLLECTION

The procedures for collecting the data consisted of having each participant maintain his or her own index card. On the index card the participant included his or her name, age and gender. During each aerobic class, each participant recorded his or her heart rate for that class.

TESTING RELIABILITY: Each member of the experimental group was given an index card. The index card asked for information pertaining to the age, gender and heart rate. For an example of an index card used, see the Appendix.

Each experimental participant was asked to keep track of his or her heart rate for one week. During this one week, each instructor taught an aerobic class which was a known routine to the experimental participants. On one of the days, either the third or fourth day, during the one week, the instructor taught an unknown routine to the experimental group. At the end of the week, all of the index cards were collected. This provided the experimental

data needed for the research study.

DATA ANALYSIS

Once the index cards were collected, the heart rates were then put into categories. Those heart rates of the **control group** were referred to as **Set 1**. There were two sets of heart rates produced by the **experimental group**. The first set of heart rates was produced by the known routine. The second set of heart rates was produced by the unknown routine (referred to as **Set 2**). The two sets of heart rates produced by the experimental group were compared by points increased or decreased. **Set 1** and **Set 2** were compared using the t-test to determine if there was a significant difference between the two sets of heart rates.

SUMMARY

This chapter, Chapter III, discussed the population, validity, methods of collecting data and data analysis for this experimental study. The next chapter, Chapter IV, will provide the findings of the experiment. Also in Chapter IV will be a presentation of the experimental results.

CHAPTER IV

FINDINGS

The problem of this study was to determine the effects of changes in routine on aerobic participants. Chapter IV will discuss the findings presented by the experiment. This chapter will also include a review of the information (data) collected.

Both groups, the control group and experimental group, were given a routine that was known to all participants. The control group consisted of forty two (42) participants. This group continued the same known routine for the length of the experiment. The experimental group also consisted of forty two (42) participants. This group was given the known routine for several classes and then was given an unknown routine. The aerobic heart rates of the control group were then compared to those of the experimental group's aerobic heart rate of the unknown routine. Because the experimental group was given the known and unknown routine, two sets of heart rates were developed. These heart rates were also compared by the degree of beats increased or decreased.

REPORT OF DATA

The t-test was used to determine if there was a significant difference between the two sets of heart rates. The set of heart rates of the control group (referred to as **Set 1**) collected and

used in this experiment are as follows:

Set 1:

130	140	150	160	160	170
130	140	150	160	170	170
130	140	150	160	170	180
140	150	150	160	170	180
140	150	150	160	170	180
140	150	160	160	170	190
140	150	160	160	170	190

The two sets of heart rates of the **experimental group** (referred to as the **known routine** and **unknown routine/Set 2**) were collected and used in this experiment are as follows:

Known Routine:

130	140	150	160	170	180
130	140	150	160	170	180
130	140	150	160	170	180
130	140	150	160	170	180
130	150	160	160	170	190
130	150	160	170	170	190
140	150	160	170	170	190

Unknown Routine/Set 2:

130	130	140	150	150	170
130	130	140	150	150	170
130	140	140	150	160	170
130	140	140	150	160	180
130	140	140	150	160	180
130	140	140	150	160	180
130	140	140	150	170	180

In reviewing the two sets of heart rates produced by the

experimental group, it was found that in going from a known routine to an unknown routine 19 out of 42 (45.24 percent) participants' heart rates decreased by ten (10) beats. The other numbers are shown in Table 3:

Experimental Group
Increase/Decrease in Heart Beats

Beats Increased or Decreased	Number of Participants	Percent
+ 10	4	9.52
same	8	19.05
- 10	19	45.24
- 20	11	26.19

Table 3

The comparison of **Set 1** and **Set 2** by the t-test proved to have a significant difference. T was found to be equal to 0.80392 which is a significant difference at the .01 level.

SUMMARY

Chapter IV discussed the data gathered and the significance of the information. The problem of this study was to determine the effects of changes in routine on aerobic participants. A control group and an experimental group were used in this study, both consisting of forty two (42) participants. The control group was given the same known routine. The experimental group was given the same known routine and then an unknown routine. It was found that the two sets of heart rates, one set from the control group with the known routine and one set from the experimental group with the

unknown routine, **did** have a significant difference at the .01 level. Chapter V provides a summary of this study. Conclusions and Recommendations that resulted from the interpretation of the collected data will also be included in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

The purpose of this study was to determine the effects of changes in routine on aerobic participants. It is important that when participating in an aerobic class one receives an effective workout. In order for an aerobic class to be effective, participants must maintain a heart rate level that is within their heart rate training zone. The heart rate training zone is found by using three steps. These three steps were discussed in Chapter 1. This includes the participants age, AMPHR (Age Predicted Maximum Heart Rate) and the Resting Heart Rate. This study was constructed to determine if a participant received a more effective workout with a known aerobic routine or an unknown aerobic routine.

CONCLUSIONS

Through this experiment it was found that a known routine versus an unknown routine does have an effect on an aerobic workout. The t-test indicates that there is a significant difference between the heart rates of a known aerobic routine and unknown aerobic routine. A participant receives a more effective aerobic workout (maintains a higher training zone heart rate) with

a known routine. The reason for this is that an aerobic participant can concentrate of using resistance and body control with a routine that is known to him or her. In exercising with an unknown aerobic routine, a participant tends to concentrate more on keeping up with the instructor and on the routine itself rather than concentrating on the workout.

RECOMMENDATIONS

From the data collected and the results of the experiment it is recommended that an aerobic instructor maintain a routine that is familiar to its participants. In doing this the routine and music may become boring to the participants. Therefore, it is also recommended that an aerobic instructor maintain a basic routine, but teach a variation or modification of the routine. Changing the music of the routine is another way to keep the routine from becoming boring. Some further recommendations are as follows:

1. When teaching a routine for the first time, review what steps are going to be used in the routine before the class begins.
2. Change the routine every two to three months.
3. Change the music every three to four weeks.
4. Use a variation of the same routine.
2. Remind the aerobic participants to concentrate on resistance and body control during the entire workout.

These are some suggestions to aerobic instructors to keep the enthusiasm in an aerobic workout and still maintain a routine that will give each participant an effective workout. Because the heart rate is an important part of determining if a workout is effective, one wants to be sure the heart rate is within a participant's training zone. This study had determined that a participant receives a more effective workout with an aerobic routine that is familiar to them.

BIBLIOGRAPHY

- Anderson, Bob. Stretching. California: Shelter Publications, 1980.
- Cantu, Robert C. Toward Fitness. New York: Human Sciences Press, Inc., 1980.
- Cooper, Kenneth H. Aerobics. New York: M. Evans and Company Inc., 1968.
- Cooper, Kenneth H. The Aerobics Program For Total Well-Being. New York: M. Evans and Company, Inc., 1982.
- Cooper, Kenneth H. The Aerobics Way. New York: M. Evans and Company, Inc., 1977.
- Dishman, Rod K. Exercise Adherence. Illinois: Human Kinetics Books, 1988.
- Getchell, Bud. Physical Fitness: A Way of Life. New York: John Wiley and Sons, Inc., 1976.
- Green, Penelope. "The Next Step," The New York Times Magazine, September 2, 1990, p. 49.
- Hobson, Anita J. and June P. Robinson. Aerobic Dance for Effective Performance. Iowa: Kendall/Hunt Publishing Company, 1987.
- Mason, Margaret. "Dancing, for the Health of It," New York Times, July 10, 1989, B:11.
- Stockton, William. "Wave Your Arms for Fitness," New York Times, June 6, 1988, C:12.
- Vodak, Paul. Exercise: The Why and The How. California: Bill Publishing Company, 1980.
- Wilmoth, Susan K. Leading Aerobic Dance-Exercise. Illinois: Human Kinetics Publishers, Inc., 1986.

APPENDIX

Example of Heart Rate Index Card

Example of Heart Rate Index Card

Name: Chelsey Bennett
Age: 18

Heart Rate	CLASS	1 ^{1/4}	2 ^{1/2}	(3)	4 ^{1/2}
1		100	100	90	100
2		130	130	120	130
3		100	150	140	100
4		100	110	160	110

Name: MONICA TERRY
Age: 34

Heart Rate	CLASS	1 ^{1/4}	2 ^{1/2}	3 ^{1/2}	4 ^{1/2}
1		130	160 110	160 130	120 110
2		100	170	160	160
3		100	170	170	170
4		120	120	120	110