

EVALUATION OF AEROBIC EXERCISE DIGITAL VIDEO DISCS (DVD)
FOR USE BY NUTRITION EDUCATORS

By

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A thesis submitted to the Graduate School-New Brunswick

Rutgers, The State University of New Jersey

in partial fulfillment of the requirements for the degree of

Master of Science

Graduate Program in Nutritional Sciences

Written under the direction of

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and approved by

New Brunswick, New Jersey

May 2009

ABSTRACT OF THE THESIS

“Evaluation of Aerobic Exercise Digital Video Discs (DVDs)
for Use by Nutrition Educators”

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Obesity is disproportionately prevalent among limited-resource audiences, like participants of the New Jersey Supplemental Nutrition Assistance Program Education (SNAP-Ed). Physical activity is an integral component for weight management, but barriers like time constraints and a lack of space and expensive equipment often prevent this target audience from meeting national physical activity recommendations. Aerobic exercise DVDs may help ameliorate these barriers; thus, this investigation's purpose was to assess their viability for use with SNAP-Ed participants both in the classroom and at home. Five nutrition educators evaluated 124 DVDs to assess their: cast members' demographics; levels of intensity and complexity; adherence to safety guidelines and exercise recommendations; and space and equipment needs. The results of this study supported the notion that exercise DVDs may help the target audience overcome physical activity barriers in that 70 (56%) of the DVDs

required no equipment, and the space requirements of all of the videos were modest.

Existing DVDs may, however, be of questionable appeal for use with SNAP-Ed participants due to a lack of racial diversity, i.e., the majority of the cast members were White, thin, adult women. Several types of DVDs, particularly “Tae Bo” and kickboxing, would likely have limited appeal for this population due to their high levels of intensity. Similarly, several types of DVDs would likely be unsuitable with regard to complexity, with belly dancing and dance aerobics workouts being rated as the most complex. Walking DVDs may be the best option for nutrition educators to recommend. They were characterized by both low intensity and complexity, yet elicited an average percent maximum heart rate for the research team of 69.88 ± 7.37 , which was consistent with national guidelines for moderate to vigorous activity. However, future research endeavors are needed to assess their feasibility with this audience.

Acknowledgements and Dedication

This research would not have been possible without the help and support of many people. First and foremost, I would like to thank Dr. Debrah Palmer for taking what seemed like a crazy idea and turning it into a really great project, and for the countless hours she devoted to this project to make it a success. My thesis committee, Dr. Arent and Dr. Hoffman, offered direction and guidance for which I am also very grateful.

This research never would have happened without the assistance of my dedicated research team- Diana Cangemi, Audrey Adler, and Kirsten Corda. I am eternally indebted to them for their participation in the evaluation of over a hundred exercise DVDs. Throughout this work, Diana provided me with encouragement and sincere friendship, and was always willing to lend a helping hand. I admire and thank Audrey for her patience and calming nature, in addition to her hard work and devotion to this project. I'm appreciative of Kirsten's willingness to help me overcome any barrier that was encountered along the way.

My gratitude also extends to two really special people in my life. I'm very lucky to have a friend like Lauren Neitzke, who has stood by my side through thick and thin since we were in 7th grade. I'd also like to thank Karl Lindauer for his love, understanding and support throughout the completion of this project.

Lastly, I would like to dedicate this work to my parents, grandparents, and brothers, who have spent every day of their lives teaching me the value of hard work. Thank you for giving the little girl who danced around her living room in leg warmers and a sweat band in the '80s everything she could ever ask for. I am forever grateful for your love and friendship.

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CHAPTER ONE: INTRODUCTION

One of the biggest challenges facing our nation is the myriad of disorders associated with overweight and obesity. Since moderate to vigorous physical activity is an integral component for weight management, educators working with national nutrition education programs, have been directed to integrate physical activity education into program curricula. The New Jersey Supplemental Nutrition Assistance Program Education initiative (SNAP-Ed), (formerly known as the Food Stamp Nutrition Education (FSNE) Program), is one of these programs. SNAP-Ed provides behaviorally-focused nutrition education to diverse, low-income audiences. Behaviorally-focused education can be defined as the provision of culturally-appropriate learning opportunities that can be practically implemented into daily lifestyles.

Although the prevalence of obesity has increased among all age and racial groups in the United States, a disproportionate prevalence has been observed among African-Americans and Hispanic populations, races that comprise the majority of SNAP-Ed participants. For example, in fiscal year 2008, 72% of NJ SNAP-Ed participants were Black and Hispanic, i.e., 46% and 26%, respectively. One explanation for the increased prevalence of overweight and obesity may be attributed to low physical activity levels among these populations. To that end, effective strategies for mobilizing SNAP-Ed's target population to engage in more moderate to vigorous physically active were needed.

In previous pilot focus groups performed to identify physical activity preferences and exercise barriers among diverse, urban, low-income adults, revealed that only a small fraction of those interviewed engaged in leisure time activities that were likely to raise their heart rates, such as basketball and walking. Most of those interviewed considered the physical labor they performed at work and at home to constitute sufficient activity.¹ The work and home activities described did seem as if they would have been exhausting and/or strenuous, e.g. mopping, heavy lifting, or providing daycare. However, the activities were not exemplary of those likely to cause heart rate increases sufficient for optimal health benefits or caloric expenditure adequate for weight loss.

In addition to focus group participants' perceptions that additional activity was not needed, many barriers to physical activity were revealed, e.g., lack of acclimation to New Jersey's climate, long work hours, childcare issues, physical disabilities, and lifestyle conflicts like smoking and alcoholism.¹ Health education topics, such as smoking cessation and alcoholism abstinence, are outside the purview of SNAP-Ed programs, but in considering the remaining findings, it was determined that the use of exercise digital video discs (DVDs) may ameliorate the other barriers.

Exercise DVDs are performed indoors, thus eliminating barriers associated with climate concerns; they are performed at home, so childcare issues are resolved; and many offer short 10 to 15-minute segments that can accommodate hectic schedules and long work hours. It was also determined that low to moderate intensity DVDs, or those offering simple

modifications, might be suitable for overweight SNAP-Ed program participants, as well as some individuals with physical disabilities, e.g. those with knee problems.

Further, exercise DVDs are inexpensive and include aerobic, strength, and flexibility components. They also require little, if any, exercise equipment and minimal space; and, can be done in a comfortable environment, i.e., the home, church, a community center, or a nutrition education classroom. Additionally, DVD players can be purchased for a very minimal cost, and the extensive variety available on the market may alleviate some of the boredom that many experience when engaging in the same exercise routine day after day. Exercise DVDs were deemed to be viable exercise options for SNAP-Ed Program participants who inhabited small dwellings, had limited budgets, and who lived in neighborhoods where it was potentially unsafe to exercise outside; however, their viability in terms of their appeal for classroom use was unknown.

Thus, this thesis documents an evaluation of aerobic exercise DVDs and their potential for use among diverse, limited-resource audiences. However, in the event that the DVDs were not deemed appropriate for this target audience, the investigation was further intent on assessing their viability for use by nutritionists/dietitians who were required to make recommendations for moderate to vigorous physical activity to the general public. The DVDs analyzed in this work were determined to be easily accessible by an urban, limited-resource community in 2006, as they were found at retail outlets commonly frequented by the community's low-income residents. DVDs evaluated were timely, in that those included

in the sample were required to have exhibited release or re-release dates that were between 2000 and 2005.

It was hypothesized that most aerobic exercise DVDs available for purchase on the market would have questionable appeal for use in SNAP-Ed classes but that they would be sufficient for overcoming target audience physical activity barriers and they would provide safe instruction. More specifically, it was hypothesized that available DVDs would:

- Have questionable appeal for use in SNAP-Ed classes due to:
 - A lack of racial, body size, age, and gender diversity among the DVD cast members and exercise leaders;
 - The use of highly intense and complex activities;
 - Requirements to engage in exercise activities that cannot be performed in the classroom setting; and,
 - The provision of insufficient modifications for the less fit.
- Be sufficient for overcoming target audience physical activity barriers as they:
 - Required modest space and equipment needs; and,
 - Were designed to be performed at home, or in other comfortable and accessible settings where childcare is unnecessary.
- Be characterized by:
 - Qualified exercise leaders;

- Effective teaching methods, e.g. proper timing of instruction, demonstrates proper rhythm, provides encouragement, etc.;
- Activities rigorously sufficient for target heart rates to be reached;
- Workout durations which could easily be incorporated into daily routines; and,
- Routines/exercises that met the American College of Sports Medicine (ACSM) exercise guidelines.

It was also hypothesized that, a team of nutrition educators would judge the DVDs similarly, i.e., there would be a high rate of inter-rater reliability on all aspects of the evaluation.

Despite any potential DVD short-comings, in terms of meeting target audience needs, it was expected that many DVDs would be appropriate for use with other audiences. Thus, an additional study aim was to identify the best use for DVDs that did not meet SNAP-Ed needs; and, to provide a descriptive account of those DVDs for nutritionists required to make recommendations to other audiences such that they meet appropriate physical activity guidelines.

CHAPTER TWO: LITERATURE REVIEW

Introduction

This literature review opens with a description of: energy balance; the terms exercise and physical activity; and, Americans' current participation rates in exercise regimens. This section also provides a review of national exercise goals and current exercise recommendations; the health benefits of regular exercise; and, the physical activity levels and health disparities common to limited-resource populations. Prior to designing a study to evaluate aerobic exercise DVDs and their potential for use among diverse, limited-resource audiences, it was also prudent to examine the characteristics and success of published investigations that had stated, similar aims. The review of these findings served as the basis for this investigation.

Energy Balance

Body weight and composition are influenced by energy balance. In healthy individuals, excess energy is stored, thus causing weight gain, when caloric intake from food exceeds caloric expenditure. Caloric expenditure is affected by an individual's basal metabolic rate (BMR), the thermic effect of food (TEF), non-exercise activity thermogenesis (NEAT), and physical activity.^{2, 3} BMR accounts for approximately 60% of daily energy expenditure, and refers to the energy used as the body performs the biochemical processes necessary to sustain life. TEF accounts for 10 to 15% of daily energy expenditure, and is that which is utilized during the digestion, absorption, and storage of food. NEAT is the energy expended for activities other than digestion, sleeping, or physical activity, such as fidgeting, typing, or

walking to work.² Physical activity, the focus of this investigation, is a component of energy outputs, and can assist in reducing the amount of energy stored in individuals as excess weight.

Physical Activity and Exercise

Despite key differences in their definitions, the terms physical activity and exercise are often used interchangeably to describe human movement; however, researchers and the government define these terms differently.⁴ Physical activity is defined as any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level. Exercise is defined as a subcategory of physical activity that is planned, structured, and repetitive.

Physical Activity

Physical activity categories include: occupational, leisure-time, household, self-care, and transportation or commuting activities. Leisure-time physical activities include: exercise, recreation, sports, or hobbies that are not associated with one's daily routine. Traditional work and leisure-time activities are physical activities, but they may not constitute viable exercises since they are often not performed in a planned, structured, or repetitive manner, and may not be adequately intense for losing and maintaining weight, or achieving optimal health or fitness outcomes.

Two levels of physical activity intensity, i.e., moderate and vigorous, have been recognized by the 2008 Physical Activity Guidelines for Americans to define how these aims can be

met.⁴ These Guidelines suggest that American adults engage in either 150 minutes of moderate intensity physical activity each week or 75 minutes a week of vigorous intensity physical activity, or an equivalent combination of moderate and vigorous intensity activity. These intensity levels were determined using absolute intensity, i.e., the amount of energy expended per minute of activity. Moderate intensity activities were defined as those that expended 3.0 to 5.9 times the amount of energy expended at rest, whereas vigorous intensity activities were defined as those that expended 6.0 or more times the energy expended at rest. The Guidelines translated this science to the public by stating that a person doing moderate intensity aerobic activity could talk but not sing during the activity, and that a person doing vigorous intensity activity would be incapable of saying more than a few words without pausing for a breath.⁴

Exercise

Exercise is a subcategory of physical activity involving actions that are “purposely intense.” It is purposive in the sense that it is planned movement aimed at improving or maintaining physical fitness, physical performance, or health and including one or more components of physical fitness, i.e., cardiorespiratory endurance, muscular strength, muscular endurance, optimum body composition, and flexibility, is the objective.⁴ To meet these objectives, exercise movements are repetitive. Thus, when people exercise they are engaging in a type of physical activity; but, when people are physically active, they are not necessarily exercising.

Since the aim of the work described in this thesis was to examine a potential means of encouraging people to engage in moderate to vigorous, purposeful, repetitive movement, via the use of DVDs, the term “exercise” is more appropriate to the work described herein. Therefore, the term “exercise” will be used when describing this investigation.

U.S. Prevalence of Physical Activity and Exercise Practices

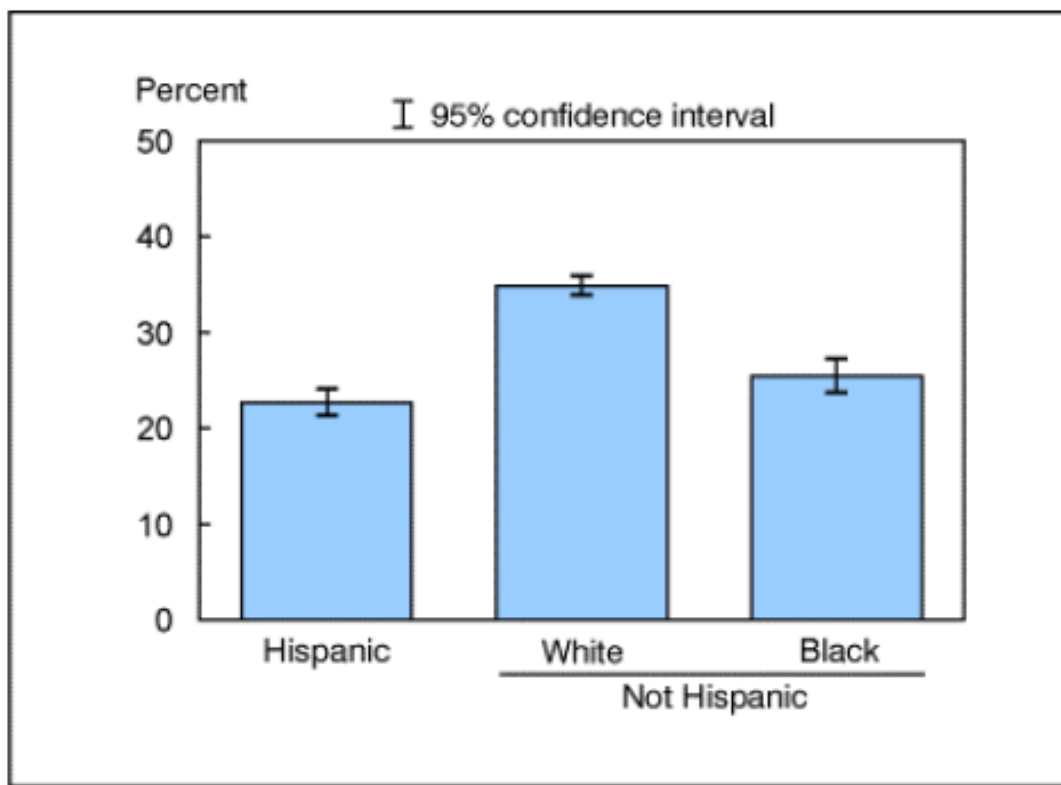
According to the Healthy People 2010 database, in 2006, 39% of adults in the US engaged in no leisure time physical activity, 31% engaged in moderate physical activity, and only 22% engaged in vigorous physical activity. The Behavioral Risk Factor Surveillance System (BRFSS) 2000 data revealed that approximately 27% of U.S. adults were physically inactive, while according to the 2005 Dietary Guidelines for Americans committee report, 38% of Americans engaged in no leisure-time physical activity in 2002.⁵

Healthy People 2010 statistics were particularly alarming among African American and Hispanic adults.⁶ Specifically, 48% of African American adults and 53% of Hispanic adults engaged in no leisure time activity; only one quarter of African American adults and 23% of Hispanic adults engaged in moderate physical activity; and only 18% of African American adults and 16% of Hispanic adults engaged in vigorous activity. Other sources found that among Black women (45%),⁷ and Mexican American men and women,⁸ another 28.2% did not participate in regular physical activity.⁹

Figure 2.1, shown below, shows the age and sex-adjusted percent of adults in the United States who participated in regular leisure-time physical activity in 2002. Whereas 34.9% of

non-Hispanic white adults participated were regularly active, only 22.7% and 25.4% for Hispanic adults and non-Hispanic Black adults, respectively, participated in regular, leisure time physical activity.¹⁰

Figure 2.1: Age-sex-adjusted Percent of Adults Who Engaged in Regular Leisure Time Physical Activity in the United States by Race/ethnicity, 2002¹⁰



Healthy People 2010 also found disproportionately low levels of physical activity among adults with low education levels.⁶ Further, 67% of adults who completed a maximum of an 8th grade education engaged in no leisure time activity.¹¹

National Physical Activity Recommendations

Physical activity recommendations in terms of frequency, duration, or intensity have been developed to provide guidance for Americans. Examples of the recommendations that were made by the Dietary Guidelines for Americans, Physical Activity Guidelines for Americans, U.S. Healthy People 2010, and the American College of Sports Medicine are shown in Figure 2.2

Figure 2.2: National Cardiorespiratory Exercise Goals for Adults				
	Dietary Guidelines for Americans (2005)⁵	Physical Activity Guidelines for Americans (2008)^{4*}	Healthy People 2010 (2010)¹²	American College of Sports Medicine (2006)^{13, 14}
All adults	≥ 30 minutes of moderate-intensity activity most days of the week	150 minutes/week moderate-intensity activity, or 75 minutes vigorous-intensity, or mix of moderate/ vigorous intensity activity	At least 30 minutes per day of moderate-intensity activity	20-60 minutes, 40 to 50% to 85% of VO ₂ R, 3- 5 days/week
Prevention of weight gain	~60 minutes of moderate- to vigorous-intensity activity, most days of the week	150-300 minutes/week of moderate-intensity activity	None	150-250 minutes/week of moderate intensity activity
Sustain weight loss	at least 60 to 90 minutes of daily moderate-intensity physical activity	>300 minutes a week of moderate-intensity activity	None	>250 minutes/week of moderate intensity activity
Weight loss	None	>300 minutes a week of moderate-intensity (for weight loss ≥ 5% of body weight)	None	150-250 minutes/week of moderate intensity activity for modest weight loss; >250 minutes/week of moderate intensity activity for clinically significant weight loss

*The Centers for Disease Control provide the same recommendations.⁽¹¹⁵⁾

In addition to the Dietary Guidelines listed above, the Guidelines stated that greater health gains could be obtained by performing more vigorous intensity exercise, or being active for longer durations. With regard to preventing weight gain and sustaining weight loss, the Dietary Guidelines also noted that the above exercise recommendations should not be performed to a level that exceeds caloric intake requirements. Also in addition to that which is presented in Figure 2.2, the Physical Activity Guidelines stated that their recommendations for sustaining weight loss or losing weight were necessary, unless caloric intake was also reduced. They did not, however, suggest the level of reduction in exercise they would recommend in correspondence with any specific degree of caloric reduction. Of note, only two of these agencies made specific recommendations for the amount of exercise needed for weight loss. The Physical Activity Guidelines Committee Report denoted that to make such recommendations large scale studies in this area need to be conducted.

With regard to the to the physical activity recommendations set, only the U.S. Healthy People 2010 set goals for meeting them. These goals were to:

- reduce the proportion of adults who engaged in no leisure-time physical activity from 40% to 20% (22-1);
- increase the proportion of adults who engaged regularly, preferably daily, in moderate physical activity for at least 30 minutes per day from 15% to 30% (22-2); and,
- increase the proportion of adults who engaged in vigorous physical activity to three or more days per week for 20 or more minutes per occasion, from 23% to 30% (22-3).¹⁵

Varying national physical activity recommendations have been developed by numerous agencies and organizations committed to public health. Notably, these recommendations differ and are scarce with regard to weight loss and weight maintenance.

The Beneficial Effects of Physical Activity and Exercise

Exercise is a therapeutic modality for health maintenance, e.g. risk reduction for overweight and obesity, heart disease, diabetes, metabolic syndrome, cancer, and osteoporosis. Exercise has also been shown to aid in the alleviation of symptoms associated with disease treatment, improve emotional well-being and aid in overcoming addiction. The following is a review summarizing the effects of physical activity and exercise on the conditions mentioned above.

Overweight and Obesity

2007 Behavioral Risk Factor Surveillance System (BRFSS) data revealed that the states of Alabama, Mississippi, and Tennessee exhibited a prevalence of obesity greater than or equal to 30%, and 30 states demonstrated obesity prevalences that were greater than or equal to 25%. The state of Colorado was the only state that exhibited an obesity prevalence of less than 20%.¹⁶

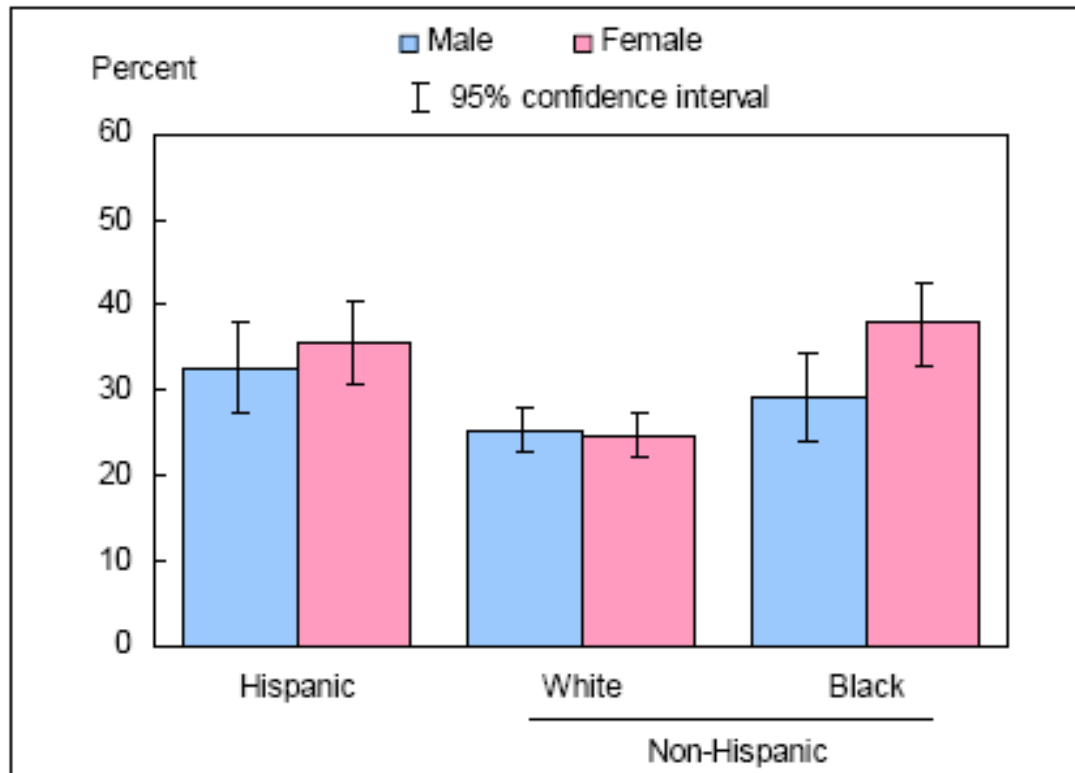
Earlier BRFSS data revealed that from 1991 to 2001 the percentage of obese adults in the U.S. increased 74%, bringing the total number of obese adults in 2001 to an estimated 44.3 million.¹⁷ In the same time frame, the percentage of overweight adult BRFSS participants climbed from 45% to 58%.¹⁷ Further, data showed that while nearly 73% of respondents reported they were trying to lose or maintain weight, only 17.5% reported they were eating

fewer calories and increasing their physical activity levels and, among these, only 40.6% reported they were meeting the physical activity guidelines of 30 minutes of moderate exercise five times a week.⁹

Among racial groups, Blacks had the highest rate of obesity in 2001.¹⁷ According to 2007 BRFSS data, obesity prevalence was still the highest for non-Hispanic black women (39%) followed by non-Hispanic black men (32.1%).¹⁸ Among women, NHANES data showed that the rise in obesity rates in women were the greatest for non-Hispanic Black women,¹⁹ with 53.2% of those aged 40- 59 years, having been obese, and 81.5% overweight. Second to Black women were Hispanic women, with 48.5% of those aged 40- 59 years having been categorized as obese, and 79.3% having been overweight. White women were the leanest, with 34.2% of those aged 40- 59 years having been obese and 51% overweight).¹⁹

Figure 2.3, shown below, shows the age-adjusted prevalence of obesity among adults ages 20 and over in the United States from January through March 2008.²⁰ The figure demonstrates that non-Hispanic white women were less likely to be obese than either Hispanic women or non-Hispanic Black women. With regard to obese males, Hispanic men are more likely to be obese than non-Hispanic white men.

Figure 2.3: Age-adjusted Obesity Prevalence Among Adults in the United States, January – March 2008²⁰



Obesity interventions, encompassing studies regarding the prevention of weight gain, weight loss, and the maintenance of long-term weight loss, have been performed that show the value of exercise in obesity control. Although limited work has been done in the area of weight gain prevention, it has been examined by some, particularly via the Pound of Prevention Study.^{21, 22} Both intervention studies identified showed some success. In the Pound of Prevention Study, participants were given a monthly newsletter which emphasized physical activity, mostly in the form of walking. Results showed that exercise, along with weighing

frequency, significantly correlated with weight gain prevention at the 0.01 level, with energy intake correlating at the 0.05 level. In the second study, a longitudinal study conducted with Caucasian adults (n=294), greater participation in work, sport, and leisure time activity at baseline was associated with less weight gain over a two year period.²¹ Some studies have shown that aerobic exercise may promote modest short-term weight loss,^{23, 24, 25, 26, 27, 28} while a wide body of literature supports the role of exercise in the maintenance of long-term weight loss.^{29, 30, 31, 32, 33, 34} Physical activity interventions, some of which focused on weight loss, are discussed in further detail below.

Based on research findings that evaluate the association of weight and health, markers for the correlates of healthy weight and body shape have been established. To determine if an individual's weight is healthy, the BMI is often used, i.e., it is used in all federal body size guidelines.^{5, 12} BMI is a mathematical formula, i.e. the ratio of an individual's mass in kilograms divided by their height in meters squared, that uses correlates with adiposity or fatness, and has been proven to be as reliable as more expensive and less easy-to-perform measures like hydrostatic weighing and dual energy x-ray absorptiometry (DXA).^{35, 36} The National Institutes of Health (NIH) clinical guidelines classify individuals with a BMI of 25.0- 29.9 as overweight and individuals with a BMI of 30 or greater as obese.³⁷

Heart Disease

The leading cause of death in the United States is heart disease. Even modest levels of physical activity have been shown to significantly decrease heart disease risk,^{38, 39} and ameliorate those conditions related to greater risk that are discussed below.^{40, 41, 42, 43, 44, 45, 46}

The conditions related to coronary artery disease (CAD) and heart attacks that are positively affected by physical activity include:

- elevated blood pressure (systolic blood pressure ≥ 140 mm Hg and/or a diastolic blood pressure ≥ 90 mm Hg), i.e. hypertension;^{47, 48}
- elevated triglycerides (≥ 150 mg/dL);^{49, 50}
- high total cholesterol levels (≥ 200 mg/dL);^{49, 50}
- decreased levels of high density lipoproteins (HDL) (≤ 40 mg/dL for men or ≤ 50 mg/dL for women);^{51, 52, 53, 54}
- increased levels of low density lipoproteins (LDL) (≥ 100 mg/dL);^{49, 50} or,
- an elevated total cholesterol to HDL ratio above 5:1.⁽⁵⁵⁾

Heart disease mortality risks were also lower in obese, fit men than in lean, unfit men.⁵⁶

Overall, a physically active lifestyle may reduce cardiovascular disease risk and may also lower risk factors for this disease, including compromised lipid panels and hypertension.

Diabetes

Diabetes is one of the leading causes of death and disability in the US, with type 2 diabetes accounting for the majority of cases.⁵⁷ Blacks had the highest rate of diagnosed diabetes among all race groups.¹⁷ Adults with less than a high school education had the highest rate of diabetes among all educational levels.¹⁷

A number of studies have examined the relationship between type 2 diabetes and physical activity. Obese, type 2 diabetics have been shown to exhibit a decrease in blood glucose

levels immediately after mild to moderate exercise.^{58, 59, 60} Studies have also shown that insulin sensitivity improves with exercise in type 2 diabetics.^{61, 62, 63, 64} These post-exercise effects are temporary, thus regular physical activity at a low to moderate intensity, is recommended for type 2 diabetics to sustain these glucose reductions and to improve insulin sensitivity long-term.^{65, 58}

Metabolic Syndrome

Metabolic syndrome, or Syndrome X, is related to the conditions discussed above, as it is a disease characterized by hypertension, dyslipidemia, and diabetes risk factors that, together, increase the risk of type 2 diabetes, coronary artery disease (CAD), and premature mortality.⁶⁶ Physical activity has proven to be a successful treatment strategy for patients diagnosed with metabolic syndrome.^{66, 67} Evidence has also suggested that, compared to less active individuals, more active men and women have lower rates of metabolic syndrome.⁴

Cancer

Regular physical activity can help prevent cancer, a major public health threat in the United States.⁶⁸ Over 565,000 cancer-related deaths were anticipated in 2008, with about one-third of these expected to be related to physical inactivity, overweight or obesity, or poor nutrition.⁶⁹ By lowering circulating insulin levels, improving energy metabolism, and contributing to the maintenance of a healthy weight, physical activity serves to significantly reduce the risk of several types of cancers. Regular physical activity has important implications for the prevention of colon cancer, as activity increases the transit time of food through the small intestine, thereby reducing the amount of time which the bowel comes into

contact with potential carcinogens.⁶⁹ Vigorous physical activity can also decrease the exposure of breast tissue to circulating estrogen, thereby reducing breast cancer risk.⁶⁹ On average, individuals who participate in three to four hours a week of moderate or vigorous intensity physical activity have a 30% lower colon cancer risk and a 20% to 40% reduction in breast cancer risk compared with sedentary individuals.⁴

The benefits of exercise also extend to patients diagnosed with cancer. Studies of exercise in cancer patients have demonstrated the positive effects of exercise on physical well-being, fatigue, and quality of life during treatment as well as post-treatment.^{70, 71, 72, 73}

Osteoporosis

Osteoporosis is a disease characterized by low bone mass and deterioration of bone tissue, which increase susceptibility to bone fracture risk. Fractures of the vertebrae and hip are common among individuals with low bone mass, and can often be deadly. Millions of Americans are at risk for developing osteoporosis, with women being four times more likely than men to develop the disease.⁷⁴ Peak bone mineral accrual rates occur during puberty, thus allowing for maximum bone mineral density (BMD) to be achieved during this time.⁷⁵ Decreasing estrogen concentrations after menopause can cause a decline in BMD, thus putting post-menopausal women at even greater risk of osteoporosis.⁷⁶

Weight-bearing and muscle-strengthening exercise is crucial to the prevention of osteoporosis. According to the ACSM, the primary goal of physical activity in adulthood should be to maintain bone mass.⁷⁷ Physical activity plays a critical role in maximizing bone

mass during childhood and early adult years, which maintains bone mass through one's fifties, thereby attenuating bone loss with aging, and reducing the number of falls and fractures in the elderly.⁷⁷ Although again, weight-bearing and muscle-strengthening exercise is crucial to the prevention of osteoporosis and BMD values tend to be highest in athletes who have participated in sports involving high-intensity loading forces, e.g., weight lifting, and body building, and lowest in athletes who participate in non-weight bearing sports such as swimming,⁷⁷ Because of the stress they place on the skeleton, and thus the positive influence they exert on bone mineral accretion, aerobic activities, such as running and jumping also reduce risk for osteoporosis.⁷⁸

The Protective Effect of Physical Activity on Well-being

The relationship between symptoms of depression and physical activity is presently unclear. Some studies have reported a direct link between participation in physical activity and improvement of depressive symptoms.^{79, 80, 81, 82, 83} However, one study suggested that these improvements may have been attributed to the social support and interaction that comes with group exercise, rather than the exercise itself.⁸⁴ In NHANES I, people who reported little or no physical activity and few depressive symptoms at baseline were twice as likely to report symptoms of depression than those who participated in moderate or vigorous physical activity at eight years follow-up.⁸⁵ Physical activity has also been shown to reduce feelings of depression in older adults.^{86, 87}

The Role of Exercise in Overcoming Addictions

Some studies have shown a positive relationship between abstinence from alcohol and smoking, and participation in physical activity.^{88, 89, 90, 91, 92, 93} In addition to the more general relationship between exercise and addiction abstinence, with regard to smoking it has also been shown to reduce one perceived barrier to smoking cessation, i.e., weight gain.^{89, 90, 91, 92}

In summary, a wide range of studies have shown that exercise can aid in the prevention and treatment of multiple diseases and health conditions.

Group-led Exercise Programs

Applied exercise programming can focus on muscular training, cardiorespiratory exercise, or flexibility programs.⁵ Programs can be offered as individual training or as group-led programs. There are various types of cardiorespiratory exercise programs (CREP), e.g., mixed-impact aerobics, step training, martial arts exercise, water fitness, and indoor cycling.⁹⁴ Aerobic exercise DVDs are designed as group-led CREP (GL-CREP), as they do not account for individuals' needs. Only mixed-impact aerobics, step training, and martial arts programs will be reviewed, as these are the program types that appear on aerobic DVDs. This portion of the literature review focuses on: the general guidelines for GL-CREP; as well as, the characteristics and guidelines specific to mixed-impact aerobics, step training, and martial arts programs.

Popular GL-CREP are alike in that they are created around a musical background.⁹⁴ The musical background serves two purposes: 1) to set the pace, and 2) to function as a source of

motivation. The music is arranged in measures of four beats, and includes emphasized beats called the downbeat, and deemphasized moves called the upbeat. It is played at a volume that doesn't prevent the participants from being able to hear the class instructor.

Components of Group-led Exercise Programs

GL-CREP are a type of cardiorespiratory program, as cardiorespiratory programs use large muscle groups in a rhythmic and aerobic manner. They can be designed to account for participants' ages and skill levels, as well as each program's overall goals.⁹⁴ Although recommendations for conducting CREP are available from a number of reputable sources, e.g., the American Council on Exercise (ACE); the Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD); and, the Aerobics and Fitness Association of America (AFAA), they are largely drawn from those outlined by the American College of Sports Medicine (ACSM). The ACSM is the largest exercise science organization in the world,⁹⁵ and is well respected among professionals in the field, which is evidenced by its strong presence in the development of the 2008 Physical Activity Guidelines for Americans, and its multiple partnerships with the National Institutes of Health (NIH), Centers for Disease Control (CDC), and the American Heart Association (AHA).⁹⁶

In 2006, the ACSM recommended that CREP ranging in duration from 20 to 80 minutes be performed three to five days a week. The ACSM guidelines suggested that each CREP include stretching, and three distinct workout sections:

- a five to ten minute warm-up;
- a 20 to 60 minute cardiorespiratory segment; and,

- a four to ten minute cool-down.

Stretching. The ACSM has traditionally recommended that stretching be performed at the end of the warm-up and cool-down segments of CREP, and can be done in standing or seated positions, or lying down.⁹⁷ With regard to placement of stretching segments, studies have provided conflicting evidence on this topic, with many concluding that stretching at the end of warm-ups and cool-downs of CREP does not prevent muscle injury and soreness as was once thought.^{98, 99, 100, 101} Further, stretching may be completely unnecessary after warm-ups for two reasons. First, warm-ups included in CREP have been shown to raise body temperature and thereby increase flexibility, perhaps more significantly or equal to stretching.^{102, 103, 104, 105} Secondly, stretching prior to warming the muscles has been shown to increase the risk of injury.¹⁰⁶ Overall, at the writing of this work, there was insufficient evidence to conclusively advise the promotion or discontinuation of stretching in both warm-ups and cool-downs. However, if stretching is used at the end of warm-ups, it should be conducted only after the muscles to be included in the workout have been sufficiently warmed.^{94, 107}

There are several different methods of stretching, such as: static, dynamic, proprioceptive neuromuscular facilitation (PNF) and ballistic stretching. Static stretching is when tension is applied to a muscle toward the end of the joint's range of motion, held for a period of at least ten seconds, and the process is repeated after a 20 to 30 second rest period.⁹⁴ This has been cited as the most common method of stretching, and, when done correctly, has been deemed appropriate and effective for all individuals.¹⁰⁸ Although individuals who are beginning an

exercise program may see improvements in flexibility with static stretching lasting ten seconds, greater gains have been observed with stretches lasting periods of at least 30 seconds.^{109, 110}

Dynamic stretching utilizes sport-specific, controlled movements, and is often used by athletes to prepare for a specific event.^{94, 107} The moves are exaggerations of the actual movements, i.e., a runner may perform a walk where they bring their knees up very high in order to stretch their legs.

PNF stretching involves alternating between isometric muscle contraction and passive, i.e., assisted, stretching through a designated series of motions. It is often perceived as complicated and generally requires the help of an experienced trainer and/or the use of equipment like a towel or resistance band.^{108, 111} Some studies have shown that PNF stretching is superior to the other forms of stretching in terms of increasing flexibility;¹¹² however, due its complicated nature it is not usually used in GL-CREP.

Ballistic stretching includes forceful, quick bouncing movements that momentarily increase the joint's range of motion. Caution should be taken when using ballistic stretching, as it has a potential for increased injury.^{94, 108}

The ACSM recommends that static and PNF stretching methods be integrated into CREP, as dynamic stretching is explicit to specific sports, and the risk associated with ballistic stretching is controversial.⁹⁴

Warm-ups. Warm-ups have been defined as a combination of rhythmic movements, advancing in a logical progression from full-body general movements to more specific muscle-joint isolation exercises, e.g., shoulder circles or neck rotations, and gradually increasing in both the intensity and complexity of the moves. The full-body exercises mimic the movements to be performed in the subsequent workout, but are executed at much lower levels of intensity.⁹⁴ Full-body movements serve to increase: blood flow to the working muscles; the speed of nerve impulses; and, the delivery rate of oxygen and energy to the working muscles.¹¹³ Warming-up has been shown to decrease the likelihood of muscle tearing by increasing the elasticity of the working muscles.¹¹⁴ During the warm-up the instructor is also to demonstrate how to correctly execute the moves which will be performed during the workout.

Cool-downs. CREP should include cool-downs that focus on bringing the body toward a resting, pre-exercise state, and improving the muscles' flexibility and the joints' range of motion. Cooling down after a workout helps prevent an unsafe drop in blood pressure by helping to prevent pooling of the blood in the arms and legs.⁹⁴ Additionally, a cool-down or the stretching at its conclusion can be designed to relax the mind from daily stressors. This section should include slow-moving rhythmical bodily movements similar to those completed in the warm-up.

Cardiorespiratory Segments. Cardiorespiratory (aerobic) segments should last at least 20 to 60 minutes. This can be done in one continuous segment or via intermittent aerobic activities throughout the day that add up to 20 to 60 minutes.⁹⁴ Intermittent cardiorespiratory segments

that last at least ten minutes have been shown to provide improvements in cardiovascular fitness comparable to longer, continuous cardiorespiratory segments.^{31, 115, 116, 117}

The intensity of the exercise was to correspond at the low end to between 55% and 65%, and at the high end, up to 90% of maximum heart rate.⁹⁴ The National Institutes of Health (NIH) recommended that the heart rate be raised during exercise to between 70% and 85%, based on an age-adjusted formula, i.e., $(220 - \text{age}) \times .70$ to $(220 - \text{age}) \times .85$.¹¹⁸

To summarize, well-designed GL-CREP like mixed-impact aerobics, step training, and martial arts exercise should include stretching, as well as warm-ups, cardiorespiratory segments, and cool-downs.

Types of Group-led Exercise Programs and Specific Safety Considerations

As previously mentioned, there are various types of CREP, e.g., mixed-impact aerobics, step training, martial arts exercise, water fitness, and indoor cycling.⁹⁴ However, since mixed-impact aerobics, step training, and martial arts programs are those primarily featured on DVDs, only these types of CREP will be discussed below. The participants' safety should be among the instructor's primary goals, thus specific recommendations for safety during each of these programs is detailed as well.

Mixed-impact Aerobics. Mixed-impact aerobic programs, a type of popular GL-CREP, are done as either high impact or low-impact aerobic movements, or a mix of the two. Low-impact movements, e.g., step touches and side lunges, place a minimal amount of stress on the lower extremities, as compared to higher-impact movements, e.g., running and jumping.

Some mixed-impact aerobic programs alternate between high and low-impact segments with every song, while others combine high and low-impact segments into each part of the choreography. The routines in mixed-impact aerobic programs are usually choreographed to music at a pace of 130 to 150 beats per minute (bpm).⁹⁴

More women than men tend to participate in mixed-impact aerobics, which may be attributed to the dance-like moves that are often used in conjunction with the music used in these programs.¹¹⁹ However, both men and women can gain health benefits by participating in this type of CREP.

A strong advantage of this type of class program is that by altering the movements' speed or range of motion, changing the amount of traveling completed within a movement, or changing the vertical direction of the movement, it can be easily modified for individuals of varying fitness levels.^{94, 119} The CREP instructor should tailor the workout to the fitness levels of the participants. Notably, this type of program can be designed to suit the needs of individuals of varying fitness levels to participate in the same group-led exercise program, if the exercise leader instructs the participants to continue at the low-impact level if they're not comfortable at the high-impact level.¹¹⁹

To ensure safety, both overall recommendations and recommendations specific to individual moves and GL-CREP type have been developed. Regarding overall safety recommendations, in addition to those previously mentioned in terms of length of segments and stretching, the overall safety recommendations made for mixed-impact GL-CREP are

identical, i.e., instructors are advised to frequently have the participants monitor their heart rates or rate their perceived exertion with the RPE scale,¹²⁰ as all participants should be encouraged to exercise at their own preferred intensity.^{94, 119} Thus, if necessary participants can be advised participants to march in place when moves become too challenging.¹¹⁹ Since these recommendations are universal, they will not be discussed below with regard to the other GL-CREP programs; nor will those associated with the specific moves described below.

Step Training. Step training is a type of popular group-led exercise program that offers low-impact exercise that can be used to provide higher-intensity aerobic conditioning for participants. Step training utilizes a step platform, which often has an adjustable height of four to 12 inches, and a stepping surface that is 14 inches wide to 42 inches long. It is recommended that step training programs be performed at a slower pace than mixed-impact aerobics, 118 to 128 bpm.⁹⁴ In addition to the methods used in mixed-impact aerobics to increase exercise intensity, the intensity of these workouts can be modified by altering the height of the step.⁹⁴ For safety sake, to lower the intensity of this type of workout the instructor can advise participants to stop stepping and to perform the moves on the ground.¹¹⁹ Additionally, with regard to maximizing safety during step training instructors should tell their participants to:

- Alternate their leading foot throughout the workout;
- Step entirely on the top part of the step, and avoid having any part of their foot to lie off the edge;
- Always look at the step platform before stepping onto it;

- Change the leading foot to prevent overstressing one leg;
- Avoid performing more than five movements in a row on one leg;
- Seek medical attention if they experience knee pain after step training; and,
- Avoid arm movements at or above the shoulder for long lengths of time.⁹⁴

Martial Arts Exercise. Martial arts exercise is a type of popular GL-CREP that includes the cardio-kickboxing programs found on DVDs. It employs moves like kicks, punches, jabs and jumping rope (usually without a rope). Some of these programs utilize a form of “shadow boxing” which requires no equipment, while others incorporate martial arts equipment like boxing gloves or punching bags. Most of these programs are performed at a moderate musical pace ranging from 120 to 138 bpm.⁹⁴

Safety requires that beginners have mastered the basic kickboxing moves before progressing to more advanced moves.⁹⁴ Since the moves are often abrupt and include controlled snapping movements, attention to the form of movements is imperative, as is the choice of music, in terms of it not being too fast. Additionally, martial arts instructors should advise their participants to:

- Ensure that the elbow does not go past its normal range of motion when performing upper body strikes and jabs;
- Avoid combinations of upper body strikes with lower body kicks;
- Avoid performing more than 10 repetitions of any martial arts move consecutively;

- Turn their toes out slightly and flex the knee of the supporting leg when kicking; and,
- Punch from the body and not just from the shoulders.⁹⁴

There are a variety of GL-CREP available for purchase on DVD, including mixed-impact aerobics, step training, martial arts exercise. Instructors of these programs should pay specific attention to participants' safety during GL-CREP.

Interventions Aimed at Increasing Physical Activity

At the writing of this work, an abundance of physical activity interventions that had been used and evaluated with the general population were found in the literature.^{121, 122, 123, 124}

However, the focus of this study was to examine DVDs that could be used as an intervention for limited-resource audiences, and a paucity of these interventions exist. It is unlikely that interventions developed for use with the general public would be successful if used with culturally diverse or low-income populations, as their study designs would not account for the specific barriers that affect this population. Thus, only those interventions that targeted culturally diverse or low-income populations, and that were published between 1989 and 2008, were reviewed and are described herein. These interventions are divided into those that employed a home-based approach, and those that employed a community-oriented approach.

Home-based Physical Activity Interventions

Home-based approaches to increasing physical activity have been evaluated and documented in the literature.^{125, 126, 127} Of the three interventions identified, one was implemented via the use of the telephone,¹²⁷ one by mail,¹²⁶ or and one using both telephone and mail.¹²⁵

The Stanford-Lockheed Exercise Study used a telephone intervention alone to provide a 24-week based program with 120 healthy men and women.¹²⁷ The participants were instructed to perform moderate-intensity exercise at home five days a week, and their progress was monitored via bi-weekly telephone calls from the research staff. The intervention group showed high exercise adherence rates, i.e., 90% for the men and 75% for the women. Greater gains in physical fitness, as measured by VO₂ max, were also observed in the intervention group, i.e., 15% for the men and 9% for the women ($p \leq 0.01$).¹²⁷

The mail-based intervention included only a single mailing, and reported that the experimental group of participants who received physical activity materials self-reported greater levels of physical activity after one month than the control group.¹²⁶

Project WALK was an intervention aimed at the promotion of walking among sedentary, ethnic minority women, utilized a both a telephone and mail-based approach. Telephone counseling was provided six times over an eight week period, with additional mail materials. Both the two and five month follow-up results were statistically significant in terms of self-reported increases in total minutes spent walking per week. At thirty- months, results remained positive, but were no longer statistically significant.¹²⁵

Of note, only the Stanford-Lockheed Exercise Study¹²⁷ used physiological measures to assess changes in physical activity, the others used only self-reported behavioral data. Further, other than the Stanford-Lockheed Exercise Study, the intensity of educational delivery was minimal. Thus, although improvement was noted in all three investigations, only the Stanford-Lockheed Exercise Study was scientifically sound, which suggests that additional research in this area is needed for conclusive results that validate the use of in-home interventions with limited-resource audiences.

Community-based Physical Activity Interventions

Published community-based physical activity interventions have been implemented in multiple community settings, i.e., churches, medical clinics/hospitals, and community or recreation centers.^{26, 27, 28, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137} Eight of the interventions, that are illustrative of these types of interventions, are summarized in Figure 2.4.

Figure 2.4: Community-based Physical Activity Interventions for Diverse, Limited-resource Audiences					
Intervention	Target Audience	Duration	Type of Exercise	Dietary Component	Significant Outcomes
Baltimore Church High Blood Pressure Program ¹³²	Female church members (98% Black)	8 weeks; 2 hour sessions/week	“Supervised” group-led; no details provided	Yes	Reductions in weight and blood pressure
Project Joy ²⁸	African American women ≥ 40 years of age	1 year; 1 session/week	30 minutes moderate-intensity activity (walking, water aerobics, or Tae Kwan Do); Group-led	Yes	Weight loss (1.1 lbs); Waist circumference (-0.66 in); Systolic blood pressure (-1.66 mmHg)

Figure 2.4: Community-based Physical Activity Interventions for Diverse, Limited-resource Audiences (continued)

Intervention	Target Audience	Duration	Type of Exercise	Dietary Component	Significant Outcomes
Physical Activity for Risk Reduction (PARR) Project ¹³⁴	Birmingham, Alabama public housing residents (99% African American)	3 years; Exact number of sessions unclear	Group-led exercise sessions	No	Improved in group exercise attendance
Pilot walking intervention/ Banks-Wallace et al. ¹³⁹	Sedentary, hypertensive African American women	1 year; 3 hour meeting/month	Group-led physical activity and at-home walking (2 days/ week)	No	Number of pedometer-measured steps, including repeated measures at 6 months
Bootheel Heart Health Project ¹³⁰	Residents (predominantly Black) of 6 low-income, SE Missouri counties	5 years; exact number of sessions unclear	Group-led, community-based walking clubs, aerobic exercise classes	Yes	Declines in physical inactivity and overweight prevalence
Community Health Assessment and Promotion Project (CHAPP) ¹³³	Obese Black residents of an urban community in Atlanta	10 weeks; 2 meetings/week	Group-led water aerobics and low-impact aerobic dance, as well as walking programs	Yes	Improved systolic (-5.8 mmHg) and diastolic (2.8 mmHg) blood pressure

Figure 2.4: Community-based Physical Activity Interventions for Diverse, Limited-resource Audiences (continued)

Intervention	Target Audience	Duration	Type of Exercise	Dietary Component	Significant Outcomes
Promotion of physical activity in low-income mothers using pedometers/ Clarke et al. ²⁶	Low-income, overweight and obese mothers of young children	8 weeks; 30 minute session/week	Group-led walking, resistance exercise, or exercising with a video tape	Yes	Weight loss (-6.6 pounds), and increased number of steps walked (assessed via pedometers)
Steps to Soulful Living (STEPS) ¹³⁷	African American women	6 months; 1 meeting/week	Weekly group-led exercise sessions	No	Exercise hours/week (2x); Weight loss (3.7 kg); Weight loss (6.2 kg) for those who attended $\geq 75\%$ of sessions
Note: Wherever values are listed for outcomes, mean values are listed.					

Notably, all of the studies described involved participation in GL-CREP. By doing so, these interventions focused on behavior modification as opposed to knowledge gain. Behaviorally-focused nutrition education interventions have been shown to be more effective than knowledge-based interventions.¹³⁸ Some of the interventions made specific recommendations for at-home physical activity.^{26, 139} The eight community-based interventions described in Table 3.2 demonstrated varying measures and varying degrees of success. One intervention found the greatest success in communities where residents described their exercise leaders as “enthusiastic.”¹³⁴ Some interventions resulted in increased participation in physical activity,^{26, 130, 134, 137, 139} while others measured weight loss,^{26, 28, 130, 132, 137} declines in waist circumference,²⁸ or improvements in blood pressure.^{28, 132, 133}

In summary, due to the use of questionable outcome measures, the success of the aforementioned home-based physical activity interventions was inconclusive. Notably, all of the community-based interventions included group-led class programs, and showed impressive results. However, only one indicated that an exercise video was used, and it was not singled out for its viability, the aim of the work described in this thesis.

Summary

In summary, this chapter provided an overview of the literature necessary to evaluate exercise DVDs. Given the health benefits associated with physical activity, and a comparison of the literature outlining current exercise recommendations to Americans' activity levels, clearly increases in exercise participation rates are needed. Previous physical activity interventions with limited-resource audiences were limited at the writing of this thesis, but of those published, success was demonstrated via the use of GL-CREP. This chapter also provided a review of the necessary aspects of exemplary GL-CREP, which will serve as the foundation for the evaluation of aerobic exercise DVDs.

CHAPTER THREE: METHODS

Researchers selected, and exercised along with and evaluated aerobic exercise DVDs to examine pertinent factors associated with their potential use in nutrition education. The factors examined, as well as all criteria for the DVD analyses, were determined based on a previous pilot study in which 38 DVDs had been examined.¹⁴⁰ This chapter includes specifics on the methods employed to select the exercise DVDs evaluated, and the surveys that assessed their potential for use with diverse audiences. It additionally includes a description of any deviations in the methodology that were deemed necessary after preliminary assessment. It concludes with a description of the analyses used to assess their potential use in programs directed toward nutrition education for limited-resource audiences, as well as findings that may be valuable to dietitians working with the general public.

Research Protocol

DVD Sample Selection

In the spring of 2006, two graduate students performed a search of Amazon.com as part of their graduate Community Nutrition course, to examine what DVDs were available for evaluation in terms of their potential for use in exercise instruction. The search revealed that there were over 5,000 exercise DVDs available on the market. Since the evaluation of this number of DVDs was not deemed feasible, it was determined that only DVDs available for purchase in local retail stores would be included in the sample.

The two graduate students, one of whom is the lead investigator on this project, identified those DVDs available in seven stores in the New Brunswick, New Jersey area, i.e., those stores deemed most likely to be used by local residents for DVD purchase. The selection venues used included: Target, located on Ryders Lane in Milltown; Walmart, located on Route 1 south in North Brunswick; Kmart, on Easton Avenue in New Brunswick; Sears, located on Route 1 south in New Brunswick; Best Buy, located on Route 18 north in East Brunswick; Barnes and Noble, located on Route 1 south in North Brunswick; and, Borders, on Route 18 in East Brunswick.

To select the DVD sample, the name of all exercise DVDs available at these locations was recorded. Since it was the 2000 Dietary Guidelines for Americans that first placed a large emphasis on physical activity, only those DVDs released or re-released between 2000 and 2005 were included in this evaluation. Using online descriptions found on Amazon.com, each DVD was classified as characteristically primarily either: cardiorespiratory conditioning (aerobic), stretching (flexibility), resistance (strength training), or any combination thereof.

Using this selection protocol, that sample was reduced to 396 DVDs. This number was still too large to be feasible for this analysis. Thus, the scope of this study was narrowed to include only DVDs that, according to their online descriptions, appeared to be comprised of primarily aerobic exercises, the type of exercise that burns the highest number of calories. This aerobic DVDs numbered 165.

Final decisions made regarding DVD exclusion criteria resulted in additional DVDs being removed from analysis. The exclusion criteria required the removal of DVDs from the sample if they:

- Were limited to one body section only (e.g., abs, arms, back, legs) (n=3);
- Were a set/compilation of DVDs and not available as separate DVDs (n=4);
- Were designed for pregnant women (n=3) or children (n=3); or,
- Required equipment that was no longer available for purchase (n=12).

This left 140 DVDs in the sample. Later, during the process of evaluating the DVDs, it was found that despite the descriptions provided on amazon.com, 16 were removed because they were not, in fact, aerobic in nature. Thus, the final sample consisted of 124 DVDs.

Assessment Methods

Multiple instruments were chosen for use in this investigation. In identifying these instruments, the research team was interested in evaluating: the performance, professionalism, and physical characteristics of the exercise leader(s); the physical characteristics of the DVD cast members; the level of difficulty experienced by the research team when they exercised along with the DVD; the perceived quality of the DVD and recommendations for its use; as well as other DVD attributes. To accomplish these aims, six assessments were employed:

- a Group Exercise Leader (GEL) Performance Appraisal Tool (PAT);¹²⁰
- a body image instrument (CDRS);¹⁴¹
- the Rating of Perceived Exertion (RPE) scale;¹⁴²

- the recorded target, resting, and maximum heart rates of research team members;
- a survey created by the research team to examine additional constructs of interest (DVD Constructs of Interest); and,
- a survey created by the principal investigator and her advisor to record other descriptive DVD attributes (DVD Attributes).

These measures are described in some detail, below. More specifics regarding the outcomes of previous work that had been done to test their validity and reliability can be found in the Appendices I, II, III, IV, and V.

Group Exercise Leader Performance Appraisal Tool. The Group Exercise Leader Performance Appraisal Tool (PAT), created by Eickhoff-Shemek and Selde, was selected to evaluate the DVD Group Exercise Leaders (GEL)s¹²⁰ (Appendix I). This instrument was designed to assist GELs' supervisors in the assessment of their employees' job performance and operational efficiency. The instrument contains three sections: an in-class evaluation, e.g., exercise routine safety, etc.; an out-of-class evaluation, e.g., whether or not the GEL makes arrangements for class when he or she cannot be present; and, a performance appraisal feedback section, whereby after a review of the evaluation with the GEL, the supervisor summarizes their discussion and plans for GEL's improvement. A space to provide comments was also included. The validity and reliability of this tool had not been assessed, but, at the time this thesis was written it was the only such tool identified. Despite its lack of validity and reliability assessment, the GEL PAT had previously been pilot tested by 12 GEL

supervisors who had provided expert review, after which it had been revised and successfully used.

For the purposes of this study, the out-of-class evaluation and performance appraisal feedback sections of the instrument were removed. Thus, only the in-class evaluation criteria were adopted, with five subscales that were not deemed pertinent to this DVD assessment removed, i.e., pre-class conduct, class management, professionalism, end-of-class conduct, and post-class conduct (see Appendix II).

The four sub-scales remaining included assessments of the GELs': 1) beginning of class conduct, e.g. welcomes everyone and encourages participants to exercise at their own level; 2) use of safe instruction, e.g. teaches an appropriate warm-up and cool-down; 3) use of effective teaching methods, e.g. uses simple command or cue words, provides positive feedback; and, 4) interaction with participants, e.g. establishes a positive rapport, demonstrates enthusiasm. Two items from the safe instruction subscale, i.e. if GELS had participants monitor their 1) heart rate and, 2) perceived exertion, were included only in the survey completed by the PI.

Items on the PAT could be rated as "improvement is needed," "meets performance standard," "exceeds performance standard," and "not applicable." For the purposes of this analysis, the "exceeds performance standard" rating was eliminated. The "not applicable" rating was left as an option for only 3 questions: 1) demonstrates modifications given various levels of

fitness; 2) incorporates exercises to address muscles that are commonly tight and/ or weak; and 3) incorporates safe transitions, e.g., standing to non-standing.

Body Image Instrument. One of the goals of this study was to assess body shape diversity among DVD GELs and cast members. To do so, Thompson and Gray's body image instrument, which had been developed to assess body shapes among the general public, was tested for use in this investigation. This instrument is comprised of nine male and nine female front-view drawings with incremental increases in waist-to-hip ratio.¹⁴¹ This instrument had been deemed to be valid and reliable by its developers. For specific information regarding the tests that were employed to assess its validity and reliability, see Appendix III.

After Thompson and Gray's body image scale was piloted by the research team in this investigation, it was determined that it was inadequate for use in this study. First, although the DVDs in the study sample did not include DVDs aimed at providing exercise instruction specifically directed toward pregnant women, it was presumed that some pregnant women might be included among other cast members. Thus, a category for pregnant women was needed. Secondly, this instrument was inadequate for assessing the body shape and size of the racially and body size diverse cast members that were of particular interest in this investigation.

No body image instruments were found that included opportunities to account for pregnancy, so the investigators added their own category for this purpose. Regarding the body shape and

size of the racially and body size diverse cast members, a more seemingly appropriate instrument was identified. This instrument, which had been developed by Pulvers, et al., had been designed using the same protocol that had been used in the development of Thompson and Gray's instrument. The Pulvers, et al. instrument was better suited for this investigation because its' drawings depicted a more consistent size gradation, particularly at the larger end of the scale; and, the hair and facial features of the drawings had been designed to resemble individuals of multiethnic backgrounds.¹⁴³ This instrument had also been shown to be both valid and reliable in terms of its content validity, inter-rater reliability, convergent validity, criterion validity, and concurrent validity.¹⁴³

Rating of Perceived Exertion Scale. One objective of this study was to evaluate the level of intensity of each DVD workout. The Rating of Perceived Exertion (RPE) scale (15-category), designed by Borg, allows exercisers to rate their feelings of effort, strain, discomfort, and fatigue, as a result of their physiological adaptations to exercise.¹⁴² The RPE scale provides verbal cues ranging from “no exertion at all” to “maximal exertion,” as well as corresponding numerical ratings that range from six to 20. The numerical ratings on the scale have been shown to highly correlate with exercisers' heart rates; i.e. a rating of six implies no exertion and a heart rate of approximately 60 beats per minute (bpm). Similarly, an RPE of 20 implies maximal exertion and a heart rate of approximately 200 bpm. Although RPE is a subjective measure, it has been shown to be a valid and reliable tool for measuring exercise intensity in adults, and it is widely used. Thus, it was an appropriate assessment instrument for evaluating exercise intensity for this study.¹⁴⁴

Target, Resting, and Maximum Heart Rates. Target, resting, and maximum heart rates were also used to assess exercise intensity in this study, since variations in heart rate during exercise correlate directly with exercise intensity. The greatest benefits of aerobic exercise are achieved when an individual's target heart rate (THR) ranges between 60% and 85% of their maximum heart rate (MHR), which is calculated by subtracting an individual's age in years from 220.¹¹⁸ Researchers' heart rates were measured to assess if the DVDs provided routines of a great enough intensity for them to fall within their THR ranges.

DVD Constructs of Interest. To address the additional aims of this investigation, the research team developed a survey (Appendix IV) to judge the DVDs': level of maximum intensity and complexity (three point Likert scales); the extent to which the directions were clearly stated for a first-time user (three point Likert scale); space requirements (three point Likert scale); perceived appropriateness for various age groups (i.e. young adults, adults, and/or seniors); and, perceived appropriateness for users at various levels of fitness (five point Likert scale). Additional questions were also added to evaluate the perceived race and age category of the cast members. Further, one question was designed to assess how much the raters "liked" the DVD (five point Likert scale).

Intensity was defined as the degree of stress that an exercise places upon the body. For example, workouts were rated as "low intensity" if they did not cause the exercisers to lose their breath; "moderate intensity" if the workout felt somewhat physically demanding to the exerciser; and, "high intensity" if it was very physically demanding, i.e., causing the

exerciser to be out of breath to the extent that he or she had difficulty carrying on a conversation.

Complexity was defined as a measure of the level of difficulty of the choreography and/or the length of movement sequences in the workout. Low complexity workouts were those rated as not including moves that were difficult to remember or keep up with, e.g., those including long series of dance steps or moves. A moderately complex workout was defined as one that included some moves that were judged as likely unknown to the average person, and/or those workouts including moves requiring slightly difficult levels of coordination. A workout of high complexity was defined as including moves that were unlikely to be common to most people, and that greatly exceeded the exercisers' level of coordination.

Space requirements of each workout were assessed in the survey as either very little, moderate, or a lot. A workout that required very little space was defined as having included moves that could be performed without having to change directions to avoid hitting furniture or walls. DVD workouts that included large movements, e.g. walking forward and back or dancing, fell under this category so long as they could be done in a small space (approximately six square feet). A workout that required a moderate amount of space included some larger movements that the researchers believed could be performed in a small apartment if the furniture was pushed to the side of the room. Workouts requiring a lot of space were defined as those that included several large, wide-spread movements. As such, a workout in this category would demand a large and somewhat empty room to be safely performed.

DVD cast members were individually judged on their age categories and racial parameters. Age categories included young adult, adult, and senior; however, the senior category was omitted for the GELs after preliminary assessment, as it appeared that none of the selected DVDs had GELs who fell into this category. Racial categories for the GELs included White (non-Hispanic), Black (non-Hispanic), Hispanic, American Indian, Asian/Pacific Islander, or “too difficult to discern.” Race categories for the participants included the same categories as those listed for the GELs, but split the category for Asian/Pacific Islander into Asian (Oriental) or from India.

Preliminary assessment revealed that some DVDs had a vast number of participants, and it was decided that rating each one individually would be impractical. Thus, data from the aforementioned pilot was assessed, such that two standard deviations from the mean could be chosen for the upper limit of the number of DVD participants that would be individually assessed, i.e., 13.

For DVDs with 14 or more participants, participants were described as a group, as follows. Gender was categorized as all female, all male, or mixed. In terms of age they were judged as being all young, all adult, all senior, or mixed. For race, participants were described as all White (non-Hispanic), all Black (non-Hispanic), all Hispanic, all Asian (Oriental), all from India, all too difficult to discern, or mixed. For body shape, participants were described as all lean, all average, all overweight, or mixed.

DVD Attributes. A second survey was created by the principal investigator and her advisor to record each DVD's attributes. These included: the workouts' adherence to current exercise recommendations; the GELs' credentials; the type of equipment required (if any); the setting of the workout; and, the cast members' attire (Appendix V).

In summary, the tools used to evaluate the DVDs in this study were:

- a Group Exercise Leader (GEL) Performance Appraisal Tool (PAT) developed by Eickhoff-Shemek and Selde;¹²⁰
- a Contour Drawing Rating Scale (CDRS) developed by Pulvers et al. (with a category added for pregnancy);¹⁴³
- the Rating of Perceived Exertion (RPE) scale designed by Borg;¹⁴²
- a heart rate monitor watch to record the research team members' heart rates, i.e., recorded target (as defined by NIH standards), resting, and maximum heart rates during the workout;
- a survey created by the research team to examine additional constructs of interest (DVD Constructs of Interest), e.g., the DVDs' complexity and space requirements; and,
- a survey created by the principal investigator and her advisor to record other descriptive DVD attributes (DVD Attributes), e.g., the GELs' credentials and the equipment needed to do the workout.

Implementation of the Research Protocol

This study was approved by the Rutgers Institutional Review Board for the Protection of Human Subjects in Research on May 29th, 2008 under protocol 08-433M. After its approval, the principal investigator conducted a training session with the evaluators to provide detailed instructions on the study protocol. The protocol was used by the study team to assess five DVDs that had been produced before 2000, i.e., DVDs that would not be included in the study sample. Prior to the study initiation, the research team met again to discuss any facets of the surveys that were in need of further clarification.

Evaluators

Five evaluators (including the PI) participated in the evaluation of the DVDs. They were: three graduate students from the Department of Nutritional Sciences at Rutgers University, the project's faculty advisor and the faculty member's research coordinator. One of the graduate students (the PI) had a bachelor's degree in Exercise Science and Sports Studies; another of the graduate students and the research coordinator both had master's degrees in Nutritional Sciences and were registered dietitians; and, both the faculty advisor, whose doctorate was in nutrition, and one graduate student, who had a bachelor's degree in nutrition, also held degrees in education. The five evaluators were all white women, but they had between four and 14 years of experience intimately working with diverse, limited-resource audiences. They varied in age, body shape, and physical fitness level. Their ages were 24, 25, 43, 53, and 56 at the start of this study. Some body sizes changed throughout the completion of this study. Researchers rated themselves, and one another. The ranges reported for each, as compared to the Thompson and Gray's body image instrument,¹⁴¹ were:

3-4, 3-4, 4-5, 4-6, and 7-9. Self-reported physical fitness levels, as defined in the DVD Constructs of Interest evaluation were 2 (low), 3 (moderate), 3 (moderate), 4 (somewhat high), and 4 (somewhat high).

DVD Distribution

From a practical standpoint, it was not possible to use a random selection process for DVD assessment, in terms of the order in which they were performed and evaluated, particularly since one of the researchers was off-site. Thus, DVDs were performed in whatever order the researcher team member wanted, or whenever each DVD became available. The latter was particularly true towards the end of the study, when all the researchers had only a few DVDs left to perform and evaluate, as well as for the research team member who was off-site, as the DVDs were mailed to her in sets.

Evaluation Protocol for DVD Assessment

Prior to beginning each workout, the researchers put on heart rate monitor watches, sat for approximately 10 minutes, and then obtained their resting heart rates. During the completion of the DVD, researchers determined their maximum heart rates (MHR) during those portions of each DVD when the workout felt most difficult and/or their MHR felt high.

After exercising along with each DVD, the research team members logged their survey responses online at <http://nutrisci.rutgers.edu/SNAP-Ed Program/DVD/Login.aspx>. This website contained the aforementioned surveys, and was designed to supply survey responses

in text format upon request. The PI completed the DVD Attributes Survey in addition to the aforementioned assessments.

Data Analysis

Data were analyzed using SAS for Windows version 9.1 (SAS Institute Inc, Cary, NC).

Descriptive statistics, i.e., frequencies and percents, were used to assess DVD characteristics, DVD cast members' demographics, and measures of exertion. The percent overall agreement was reported for the primary GELs' demographics. However, completing this for the additional GELs and cast members was not feasible; thus most frequent response was reported for the demographics of these additional DVD participants. Chronbach's alpha was used to determine the inter-rater reliability of the subscales of the GEL-PAT.

CHAPTER FOUR: RESULTS

Introduction

This chapter serves to report various descriptive statistics on the characteristics of aerobic exercise DVDs, including their safety and adherence to exercise recommendations. The demographics, i.e., age category, body shape, gender, and race, of both the GELs and cast members are also reported. DVD characteristics pertinent to the viability of their use in the classroom and at home by diverse, low-income audiences are also described. This chapter begins with an examination of the inter-rater reliabilities resulting from researcher ratings for the GEL-PAT, and closes with an examination of the relationships identified among various types of DVD workouts, and their intensities as experienced by the research team, i.e., the maximum heart rates, heart rate changes, and RPEs they reported when they worked out along with the DVD GELs.

DVD Descriptive Information

The information presented in the following section describes select characteristics of the DVDs, including: the year they were produced; the types of GL-CREP they contained; their intensities and complexities; as well as their adherence to safety recommendations, as rated by the research team. Details on the demographics of the DVDs' instructors and cast members are also provided, in addition to information regarding the DVDs' level of difficulty. DVD characteristics deemed pertinent for successful classroom and home use with urban, limited-resource audiences, e.g., space and equipment needs, are also described.

DVDs' Availability and Release/re-release Dates

For a complete list of the DVDs evaluated in this investigation, see Appendix VI. All of the DVDs analyzed in this work were available for purchase in retail outlets easily accessible to and commonly frequented by limited-resource audiences. The DVDs included in this work were required to have been released or re-released between 2000 and 2005. Table 4.1 shows the year that the DVDs were released or re-released.

Table 4.1: Number and Percent of the DVDs' Release or Re-release Dates, by Year	
Year	Number and Percent
2000	1 (1%)
2001	6 (5%)
2002	17 (14%)
2003	22 (18%)
2004	34 (27%)
2005	44 (35%)

Types of GL-CREPs on DVDs

As stated in the Methods, three types of GL-CREP were typically featured on aerobic exercise DVDs, i.e., mixed-impact aerobics, step training, and martial arts exercise. Analysis of the DVDs showed that the mixed-impact aerobics in the sample (n=101; 82%) could be further sub-divided into floor (or general) aerobics (n=58; 47%), dance approaches (n=17; 14%), belly dancing (n=8; 6%), and walking (n=18; 14%). Martial arts exercise programs (n=17; 13%) included “Tae Bo” (Tae Kwan Do) (n=9; 7%), kickboxing (n=4; 3%), and “boot camp” (n=3; 2%) workouts. Seven (6%) of the DVDs were classified as step training workouts. The analyses also showed that the DVDs could be categorized in other manners, i.e., by featured GEL(s) or by DVD producer(s). Featured GELs, defined as those with three

or more of their DVDs included in the sample, were: Billy Blanks (n= 9; 7%), Denise Austin (n=6; 5%), Jillian Michaels (n=3; 2%), Karen Voight (n=4; 3%), Kathy Smith (n=10; 8%), and Leslie Sansone (n=16; 13%). Popular producers, defined as those with three or more of their DVDs included in our sample, included Belly Dance Fitness (n=3; 2%), Crunch (n=6; 5%), the Goddess Workouts (n=3; 2%), Prevention (n=3; 2%), and The Method (n=6; 5%).

Other DVD Characteristics

Various DVD characteristics pertinent to the aims of this research are described in the section below.

Intensity, Complexity, and Fitness Level Recommendations. Although rating categories were more explicit on the survey used, research team ratings were insufficiently correlated. Thus, to better enable the researchers to answer the hypotheses, as well as to improve overall agreement, the intensity, complexity, and fitness level recommendations were recoded. Since low intensity and low complexity workouts that can be used by people with a low to moderate level of fitness was desired, those workouts rated as meeting these criteria were recoded to have a value of one, and those that did not were recoded as a zero. This recoding resulted in overall agreements of 57% (n=71) for intensity; 43% (n=53) for complexity; and, 55% (n=68) for fitness level.

DVD characteristics according to the type of workout provided, as well as their producer/featured GEL, are shown in the tables below.

Table 4.2: Ratings of DVD Characteristics by Workout Type (Means $\pm$ Standard Deviations)			
DVD Type	Intensity Rating	Complexity Rating	Fitness Level Rating
Walking (n=18)	0.97 $\pm$ 0.18	1.00 $\pm$ 0.00	0.94 $\pm$ 0.23
Step Aerobics (n=7)	0.49 $\pm$ 0.51	0.80 $\pm$ 0.41	0.49 $\pm$ 0.51
Aerobics (n=58)	0.71 $\pm$ 0.46	0.89 $\pm$ 0.32	0.72 $\pm$ 0.45
“Tae Bo” (n=9)	0.11 $\pm$ 0.32	0.93 $\pm$ 0.25	0.13 $\pm$ 0.34
Boot camp (n=3)	0.33 $\pm$ 0.49	0.93 $\pm$ 0.26	0.13 $\pm$ 0.35
Kickboxing (n=4)	0.45 $\pm$ 0.51	0.95 $\pm$ 0.22	0.40 $\pm$ 0.50
Dance (n=17)	0.87 $\pm$ 0.34	0.66 $\pm$ 0.48	0.90 $\pm$ 0.30
Belly dancing (n=8)	0.93 $\pm$ 0.27	0.70 $\pm$ 0.46	0.93 $\pm$ 0.27
0= unfavorable rating; 1= favorable rating, in terms of predicted viability for use with the target audience			

Table 4.3: Research Team Heart Rate and Exertion Levels According to DVD Workout Type (Means $\pm$ Standard Deviations)			
DVD Type	Maximum Heart Rate	Rating of Perceived Exertion	Percent Maximum Heart Rate Achieved During Workout
“Tae Bo”	143.62 $\pm$ 22.54	16.36 $\pm$ 1.54	79.92 $\pm$ 8.25
Boot camp	143.13 $\pm$ 21.78	15.73 $\pm$ 1.83	79.69 $\pm$ 7.92
Kickboxing	143.05 $\pm$ 22.93	15.2 $\pm$ 1.77	79.55 $\pm$ 7.91
Step Aerobics	140.89 $\pm$ 19.57	15.00 $\pm$ 1.93	78.57 $\pm$ 7.68
Aerobics	135.42 $\pm$ 20.19	13.97 $\pm$ 1.99	75.52 $\pm$ 8.45
Walking	125.09 $\pm$ 16.66	12.11 $\pm$ 2.04	69.88 $\pm$ 7.37
Dance	124.97 $\pm$ 17.64	12.66 $\pm$ 1.91	69.74 $\pm$ 7.48
Belly dancing	119.58 $\pm$ 18.96	11.73 $\pm$ 2.28	66.71 $\pm$ 8.45

The percent maximum heart rate reached by researcher varied by individual, with at least one researcher’s maximum heart rate exceeding 90% on at least one DVD by: “Tae Bo” (98.46%), kickboxing (94.36%), step aerobics (92.27%), and boot camp (88.72%). The

aerobic DVDs exhibited the greatest range in percent maximum heart rates, with the minimum being 40.00% and the maximum being 103.95%.

Table 4.4: Ratings of DVD Characteristics According to the Featured GEL/Producer (Means $\pm$ Standard Deviations)			
Featured GEL or Producer	Intensity Rating	Complexity Rating	Fitness Level Rating
Leslie Sansone (n=16)	0.96 $\pm$ 0.19	1.00 $\pm$ 0.00	0.94 $\pm$ 0.24
Denise Austin (n=6)	0.67 $\pm$ 0.48	0.97 $\pm$ 0.18	0.63 $\pm$ 0.49
Crunch (n=6)	0.77 $\pm$ 0.43	0.80 $\pm$ 0.41	0.73 $\pm$ 0.45
Billy Blanks (n=9)	0.11 $\pm$ 0.32	0.93 $\pm$ 0.25	0.13 $\pm$ 0.34
Prevention (n=3)	0.93 $\pm$ 0.26	0.73 $\pm$ 0.46	0.93 $\pm$ 0.26
Kathy Smith (n=10)	0.62 $\pm$ 0.49	0.80 $\pm$ 0.40	0.78 $\pm$ 0.42
Jillian Michaels (n=3)	0.00 $\pm$ 0.00	1.00 $\pm$ 0.00	0.07 $\pm$ 0.26
Karen Voight (n=4)	0.40 $\pm$ 0.50	0.65 $\pm$ 0.49	0.35 $\pm$ 0.49
The Method (n=6)	0.70 $\pm$ 0.47	0.80 $\pm$ 0.41	0.57 $\pm$ 0.50
Belly Dance Fitness (n=3)	0.87 $\pm$ 0.35	0.87 $\pm$ 0.35	0.87 $\pm$ 0.35
Goddess Workout (n=3)	1.00 $\pm$ 0.00	0.47 $\pm$ 0.52	1.00 $\pm$ 0.00
0= unfavorable rating; 1= favorable rating, in terms of predicted viability for use with the target audience			

Table 4.5: Research Team Heart Rate and Exertion Levels According to the DVD Featured GEL or DVD Producer (Means $\pm$ Standard Deviations)			
Featured GEL or DVD Producer	Maximum Heart Rate	Rating of Perceived Exertion	Percent Maximum Heart Rate Achieved During Workout
Jillian Michaels	148.20 $\pm$ 22.05	16.80 $\pm$ 1.47	82.61 $\pm$ 9.06
Billy Blanks	143.62 $\pm$ 22.54	16.36 $\pm$ 1.54	79.92 $\pm$ 8.25
Karen Voight	143.05 $\pm$ 19.90	15.15 $\pm$ 1.31	79.70 $\pm$ 6.88
Denise Austin	139.83 $\pm$ 20.02	14.27 $\pm$ 1.53	77.91 $\pm$ 7.37
Kathy Smith	137.20 $\pm$ 18.46	14.24 $\pm$ 1.42	76.49 $\pm$ 6.78
The Method	134.23 $\pm$ 20.60	14.17 $\pm$ 1.95	74.73 $\pm$ 7.71
Prevention	133.60 $\pm$ 16.38	13.20 $\pm$ 1.52	74.54 $\pm$ 5.63
Crunch	133.10 $\pm$ 16.82	13.73 $\pm$ 1.66	74.27 $\pm$ 6.37
Leslie Sansone	124.79 $\pm$ 17.04	12.05 $\pm$ 2.12	69.72 $\pm$ 7.62
Belly Dance Fitness	124.00 $\pm$ 20.06	12.27 $\pm$ 2.52	69.12 $\pm$ 8.59
Goddess Workout	111.73 $\pm$ 16.99	10.60 $\pm$ 2.26	62.38 $\pm$ 7.63

The percent maximum heart rate reached by researcher varied by individual, with at least one researcher's maximum heart rate exceeding 90% on at least one DVD by: Billy Blanks (98.46%), Denise Austin (93.37%), Karen Voight (92.27%), Kathy Smith (92.31%), and Jillian Michaels (103.95%).

Setting and Clothing. Other analyses revealed that the majority of the DVDs were filmed in a workout studio (n=89; 72%). Other workouts took place on the beach (n=4; 3%), at a “regular” home (n=11; 9%); at a mansion (n=2; 2%); or at another location like a gym or in a garden (n=18; 14%). In 51% of the DVDs, the participants were wearing matching clothing.

Modifications and Floor Exercises. No workout modifications were provided for 38 (31%) of the DVDs, whereas both verbal and visual modifications were provided in 52 (42%) of the

DVDs. In the remaining 34 (27%) DVDs, either verbal or visual modifications were provided. Sixty-four (52%) DVDs did not include floor exercises.

Group Exercise Leader Demographics

The research team was in 97% overall agreement that 107 (86%) of the primary GELs were white; in 100% overall agreement that 110 (89%) of the primary GELs were female; and, in 70% overall agreement that 110 (89%) of the primary GELs were in the adult age category. The mean body shape of the primary GEL was 2.98 ± 0.9 . Table 4.6 shows the number and percent of the male and female primary GELs' body shapes. Only one (1%) of the primary GELs was pregnant.

Table 4.6: Primary Group Exercise Leaders' Body Shapes by Gender								
								
0%	0%	6 (5%)	5 (4%)	2 (1%)	1 (1%)	0%	0%	0%
2 (1%)	31 (25%)	63 (51%)	11 (9%)	2 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
								

Only 11 of the 124 DVDs (9%) had additional GELs (n=16). Of these DVDs, eight (73%) had only one additional GEL, one had two (9%) additional GELs, and two had three (18%) additional GELs. Similar to what was found with the primary GELs, the majority of the additional GELs were white (n=12; 75%) adult (n=14; 88%) women (n=13; 81%). None of the additional GELs were pregnant. The number and percent of the additional GELs' body shapes is presented in Table 4.6.

Table 4.7: Numbers and Percents of the Additional GELs' Body Shapes								
								
0	2 (12%)	12 (75%)	0	2 (12%)	0	0	0	0
								

Overall Likeability of the Group Exercise Leaders

The overall likeability of the GELs was assessed via the Beginning of Class Conduct and Interaction with Participants subscales of the GEL-PAT. The means and standard deviations, as well as the % overall agreements, for the overall likeability of the GELs are presented in Table 4.7. A value of one indicates a favorable rating in terms of predicted viability for use with the target audience, whereas a zero indicates an unfavorable rating.

Table 4.8: Overall GEL Likeability		
	Mean $\pm$ Standard Deviation	Percent Overall Agreement
Did the GEL welcome everyone?	0.98 $\pm$ 0.15	95.2%
Did the GEL encourage the participants to exercise at their own level?	0.81 $\pm$ 0.39	62.1%
Did the GEL establish a positive rapport?	0.97 $\pm$ 0.17	95.2%
Did the GEL incorporate humor appropriately?	0.83 $\pm$ 0.37	50%
Did the GEL demonstrate enthusiasm?	0.94 $\pm$ 0.23	89.5%
Did the GEL create an enjoyable class?	0.91 $\pm$ 0.29	87.9%
0= unfavorable rating; 1= favorable rating in terms of predicted viability for use with the target audience		

DVD Cast Member Demographics

Exercisers who were not GELs will be referred to as cast members. Most of the DVDs had at least one cast member (n=106). However, six of these DVDs had 14 or more cast members, making it too difficult to assess cast member attributes. DVDs had an average of 5 ± 2.83 cast members. The DVDs with less than 14 participants had a total of 515 participants, with 207 (40%) of them being categorized as young adults, 293 (57%) as adults, and 15 (3%) as seniors. With regard to the race of these participants 400 (78%) were White, 72 (14%) were Black, 24 (4%) were Hispanic, 15 (3%) were Asian, none were judged as being from India, and 4 (1%) were deemed too difficult to discern. With regard to gender, the majority of the cast members were women (n=430; 83%). The number and percent of cast members' body shapes are presented below, in Table 4.8.

Table 4.9: Numbers and Percents of the Cast Members' Body Shapes								
								
0 0%	9 2%	35 7%	36 7%	4 1%	1 0.2%	0 0%	0 0%	0 0%
								
0 0%	94 18%	222 43%	87 17%	21 4%	3 0.05%	3 0.05%	0 0%	0 0%

Results Pertaining to Exercise DVDs' Viability For Use with Diverse, Low-income

Audiences

DVDs with modest space requirements and equipment needs were deemed important for their viability for use with diverse, limited-resource audiences.

Space. The space required to perform the DVD was divided into three categories, i.e., little space, moderate space, or large space required. The lead researcher on this project categorization the workouts according to the type of DVD workout (Table 4.9).

Table 4.10: Space Requirements by DVD Workout Type (Number and Percent)			
DVD Type	Small Space	Moderate Space	Large Space
Walking	89% (n=16)	11% (n=2)	0% (n=0)
Belly Dancing	75% (n=6)	25% (n=2)	0% (n=0)
Kickboxing	75% (n=3)	25% (n=1)	0% (n=0)
Boot Camp Aerobics	67% (n=2)	33% (n=1)	0% (n=0)
Aerobics	59% (n=34)	41% (n=24)	0% (n=0)
“Tae Bo”	33% (n=3)	67% (n=6)	0% (n=0)
Dance	24% (n=4)	76% (n=13)	0% (n=0)
Step Aerobics	0% (n=0)	100% (n=7)	0% (n=0)

Equipment. Equipment needs were, for most videos, moderate and relatively inexpensive.

Seventy (56%) DVDs required no equipment at all. Table 4.10 shows the number and percent of DVDs that required equipment, e.g., weights, chairs, resistance bands, steps, mats, the Transfirmer®, or other types of equipment. The Transfirmer® was comprised of two steps that can be used alone or stacked together to provide a higher level of intensity. The steps were also used to be stacked perpendicularly to provide an incline step. The other category included equipment like a step stool or jump rope.

Table 4.11: Equipment Needs for DVD Workouts	
Type of Equipment	Number and Percent
Weights	27 (22%)
Chair	7 (6%)
Resistance Band	4 (3%)
Step	10 (8%)
The Transfirmer®	3 (2%)
Mat	25 (20%)
Other	7 (6%)
Note: Some DVDs required the use of more than one piece of equipment.	

Results Pertaining to DVD Exercise Standards

The beginning of this section reports on the GELs' credentials, use of safe teaching methods, and the adequacy of their instruction for exercise beginners. The latter portion of this section describes the exercise DVDs' adherence to recommendations for stretching, as well as the length of the warm-ups, workouts, and cool-downs.

Qualified Exercise Leaders. Exercise leader qualifications included educational, credential, and experiential components. Organizations providing credentialing for GELs include the ACSM, the American Council on Exercise (ACE), the Aerobics and Fitness Association of America (AFAA), and the Cooper Institute. Less than half (n=57; 46%) of the instructors leading the DVD workouts in this investigation were certified by one of these organizations (Table 4.11). Instructors who were identified as having been certified through one of the recognized credentialing agencies listed above were counted twice in Table 4.11, i.e., as both a qualified leader/instructor and again in the credentialing agency's categories. The credentialing organization for some GELs was not available. If the credentialing agency was unknown the GEL is included only once in the table below.

Table 4.12: Group Exercise Leaders' (GELs) Credentials	
Credential	Number and Percent
Certified Group Exercise Leader	57 (46%)
Certified Personal Trainer	35 (28%)
Certified Strength and Conditioning Specialist	1 (1%)
ACE Certified	17 (14%)
ACSM Certified	24 (19%)
AFAA Certified	22 (18%)
Cooper Institute Certified	18 (15%)
College Degree in Exercise-Related Field	17 (14%)

Dance aerobics and martial arts workouts were often led by professional dancers (n=36; 29%) and martial arts instructors (n=10; 8%), respectively. Although 38 (31%) GELs were found to have been given “prestigious awards,” for one GEL (Kathy Smith), a fitness award was her only qualification. One GEL had no certifications or awards (Jane Fonda).

Adequacy of Directions. The rating for adequacy instructional adequacy was converted to a dichotomous variable, i.e., inadequate or adequate. This variable exhibited 76% overall agreement. The adequacy of instruction ratings, as judged via a scale of one (inadequate) to three (adequate), had relatively similar results among workout types. On average, the instructional ratings for featured DVD GELs were: Billy Blanks (0.91 ± 0.30), Denise Austin (0.91 ± 0.30), Jillian Michaels (0.67 ± 0.52), Karen Voight (0.62 ± 0.51), Kathy Smith (0.93 ± 0.26), and Leslie Sansone (1.00 ± 0.00). The instructional ratings for DVD producers were: Belly Dance Fitness (0.82 ± 0.40), Crunch (0.89 ± 0.33), the Goddess Workouts (0.75 ± 0.46), Prevention (0.60 ± 0.55), and The Method (0.81 ± 0.40).

Adherence to Exercise Guidelines. Table 4.12 shows the minimum, maximum, mean, and standard deviation for the DVDs’ warm-up, workout, and cool-down length.

Table 4.13: Length of DVDs’ Warm-ups, Workouts, and Cool-downs (in minutes)			
	Minimum	Maximum	Mean and Standard Deviation
Warm-up	0	21	4.87 ± 4.52
Workout	7	55	25.03 ± 11.45
Cool-down	0	15	4.33 ± 2.92

With regard to stretching, 75 (60%) of the DVDs included stretching in the warm-up. The majority of the DVDs included stretching in the cool-down (n=110; 89%).

Appraisal of Group Exercise Leader Performance

Subscales included on the Group Exercise Leader-Performance Appraisal Tool (GEL-PAT) were additionally used to evaluate the DVDs' quality. The internal consistency was calculated for each of the four subscales, i.e., "Safe Instruction," "Safe Instruction Throughout the Class," "Effective Teaching Methods," and "Beginning of Class Conduct/Interaction with Participants." They were 0.71, 0.67, 0.67, and 0.67, respectively. Scale ranges were: Safe Instruction (0-5); Safe Instruction Throughout the Class (0-10), Effective Teaching Methods (0-9), and Beginning of Class Conduct/Interaction with Participants (0-6).

Table 4.14: Ratings for Instructional Techniques According to the DVDs' Featured GEL/Producer (Means $\pm$ Standard Deviations)				
Featured GEL or Producer	Safe Instruction Rating	Safe Instruction Throughout Class Rating	Effective Teaching Methods Rating	Beginning of Class/Interaction with Participants Rating
GELs				
Billy Blanks (n=9)	4.18 $\pm$ 1.21	9.31 $\pm$ 0.92	8.44 $\pm$ 0.81	5.67 $\pm$ 0.48
Denise Austin (n=6)	4.77 $\pm$ 0.63	9.33 $\pm$ 1.03	7.80 $\pm$ 1.73	5.67 $\pm$ 0.66
Dolphina "Goddess Workouts" (n=3)	4.13 $\pm$ 0.99	8.93 $\pm$ 0.96	8.27 $\pm$ 1.10	4.47 $\pm$ 1.41
Jillian Michaels (n=3)	2.73 $\pm$ 1.44	7.87 $\pm$ 1.50	7.80 $\pm$ 1.57	5.13 $\pm$ 1.12
Karen Voight (n=4)	4.00 $\pm$ 1.08	7.95 $\pm$ 1.88	7.90 $\pm$ 1.02	4.35 $\pm$ 1.63
Kathy Smith (n=10)	4.14 $\pm$ 1.31	8.90 $\pm$ 1.26	8.36 $\pm$ 1.14	5.74 $\pm$ 0.53
Leslie Sansone (n=16)	4.94 $\pm$ 0.24	9.84 $\pm$ 0.49	8.76 $\pm$ 0.60	5.99 $\pm$ 0.11
Producers				
Belly Dance Fitness (n=3)	4.13 $\pm$ 0.99	8.53 $\pm$ 1.55	7.53 $\pm$ 1.36	4.73 $\pm$ 1.10
Crunch (n=6)	4.43 $\pm$ 0.97	8.67 $\pm$ 1.15	8.50 $\pm$ 0.82	5.70 $\pm$ 0.60
Prevention (n=3)	4.73 $\pm$ 0.46	8.93 $\pm$ 0.96	8.40 $\pm$ 0.83	5.73 $\pm$ 0.46
The Method (n=6)	3.53 $\pm$ 1.31	8.00 $\pm$ 1.53	7.47 $\pm$ 1.36	4.73 $\pm$ 1.23

Summary

These results show a wide variation in the quality of, and potential use for, the DVDs examined in this work. Further, they support implications for nutrition education that examined in the next two chapters of this thesis.

CHAPTER FIVE: DISCUSSION

Introduction

The intent of this study was to evaluate aerobic exercise DVDs' potential for use among diverse, limited-resource audiences, like SNAP-Ed participants. Further, the investigation aimed to provide needed information regarding exercise DVD recommendation specifics that could be used by nutritionists/dietitians who were required to make recommendations for moderate to vigorous physical activity to the general public. The results of this work show that existing aerobic exercise DVDs may provide practical solutions for the general population's exercise needs, but are largely inappropriate for use in nutrition education directed toward limited-resource audiences. This chapter will provide a detailed description of specifics regarding the DVDs suitable for use in nutrition education, according to the hypotheses stated in the thesis introduction. It concludes with a discussion of the study limitations.

DVD Use with SNAP-Ed Participants

The following section synthesizes the findings from this study to examine the viability of recommending aerobic exercise DVDs for use by limited resource individuals, according to the study's hypotheses.

Likely Appeal of Exercise DVDs for Use in SNAP-Ed Classes

Based on GELs' and participants' physical characteristics, the exercise DVDs' levels of difficulty, and the practicality of their use in terms of their viability with the target audience,

this study supported the notion that existing aerobic exercise DVDs would be of questionable appeal for their use in SNAP-Ed classrooms.

Regarding GEL and cast member physical characteristics, researchers found a clear lack of racial, body size, age, and gender diversity. The majority of the cast members and GELs were White, thin, adult women. This suggests that these DVDs would likely have limited appeal among New Jersey SNAP-Ed participants who are primarily African American and Hispanic, as well as among many other limited-resource populations.

At the writing of this thesis there was no research assessing the target audiences' preferences for race, age, or gender among aerobic workout DVD cast members and GELs. However, research in the area of GEL body shape preference in aerobics classes had been conducted, and it had been documented that GELs were often viewed as role models for active lifestyles.^{94, 145} In a small study of White female college students who regularly participated in or instructed GL-CREP, both the instructors and participants interviewed agreed that instructors should serve as body role models. The GELs and participants described the ideal instructor's body as "lean, toned, and strong."¹⁴⁶ This would suggest that the GELs in the DVDs assessed in this investigation were of an appropriate body shape.

However, the five GELs and the six college students interviewed were all white, themselves. Multiple studies have reported that what is viewed as the ideal body size by African American women is heavier,^{147, 148, 149} thus it is likely that a thin GEL may not be viewed as

ideal by individuals who are not white. It further suggests that the DVDs evaluated in this study may have limited appeal to SNAP-Ed participants.

In the absence of additional research it is logical to presume that people who exercise along with a DVD would, at the very least, desire to see someone in the cast who resembles them in terms of their age, gender, and/or racial group. While in fiscal year 2008, most NJ SNAP-Ed participants (94%) were adults, 50% were males and 72% were not white. Therefore, it is reasonable to predict that in terms of these GEL and cast member characteristics would not be best suited to this target audience.

In considering the level of difficulty associated with exercising along with the DVDs, with disproportionately low levels of physical activity and high levels of over weight and obesity among the target audience, most of those DVDs available on the market at the time of this work were not suitable for their fitness needs. DVD complexity was predominantly appropriate, with the exception of many of the dance and belly dance DVDs. However, whereas the step aerobics, aerobics, Tae Bo, kickboxing, and boot camp aerobic DVDs required little in the way of complex moves, their intensity requirements were often high. Only the walking DVDs were characterized by both low intensity and complexity. Yet, even though they are perceived to require little in the way of complexity and intensity, the average percent maximum heart rate reached by the researchers was 70%, a rate of exertion that is consistent with NIH recommendations. Since it has been predicted that the target audience would best like workouts that were not perceived as being too difficult to do, but the aim of

nutrition educators is to provide an adequately vigorous workout, one would predict that walking DVDs would appeal to both the target audience and the nutrition educators.

The likeability ratings given by the researchers further support this notion, particularly with regards to the walking DVDs. In terms of researcher ratings, the walking DVDs were the best liked, while the belly dancing workouts were awarded the lowest ratings. The likeability of featured DVD GELs and/or DVD producers was consistent with this finding in that the likeability ratings attributed to Leslie Sansone, whose DVDs feature “at-home” walking rated considerably higher than the “Goddess” workouts, which were focused on belly dancing. On the basis of this data, as well as conversations among the researchers, it is clear that the walking DVDs were consistently well liked, but otherwise DVD preferences varied.

Exercise DVDs’ Potential for Overcoming Participants’ Physical Activity Barriers

Exercising indoors can help the target audience overcome several of the barriers that prevent them from being physically active, both at home and in class. When people exercise indoors, child care is less of a problem, and bad weather is inconsequential. Further, the increased risk associated with exercising outside in an unsafe neighborhood is eliminated. Two barriers, i.e., lack of space and the inability to purchase expensive equipment, remain. Although the DVD characteristics presented above suggested limited appeal for use with SNAP-Ed participants, their potential for overcoming the barriers that prevent participants from being physically active requires examination.

With regard to the workouts' space requirements, none of the DVDs evaluated in this study required a large amount of space. In fact, with the exception of the Tae Bo, dance aerobics, and step aerobics workouts, most of the exercise DVDs required very little space to perform. Thus, the use of aerobic exercise DVDs may provide a suitable option for limited-resource populations, who often have only small areas to exercise, whether at home or in nutrition education class.

In terms of the second barrier, i.e., cost, there are several to be considered. Costs include: DVDs, DVD players, and any equipment needed for the workouts. In a study conducted by Kirsten Corda, one of the research team members in this investigation, 82% of the 455 limited-resource individuals she interviewed owned a DVD player; a finding that is consistent with the fact that DVD players are low in cost, as are workout DVDs. With regards to equipment costs, although nearly half of the DVDs required the use of equipment, the most commonly used were weights/dumbbells. Weights can be purchased for a minimal cost. Further, although none of the DVDs mentioned it, household items like soup cans and bags of rice can be used in their stead.

In light of the findings above, it appears that exercise DVDs are a viable means of reducing barriers to exercise, by providing a low-cost, safe and convenient means of exercising in the home.

Exercise DVDs' Viability as an Appropriate Means of Performing Physical Activity

When it comes to physical activity, the most important things to consider are the quality of the guidance and the efficacy of the workout. The quality of the guidance can be assessed in terms of the qualifications of the GEL, the demonstration of effective teaching methods, and the adherence to ACSM guidelines. Workout efficacy can be evaluated by examining the workouts' rigor and duration.

GL-CREP are led by GELs, who are seen as "experts" on account of the instructional role they assume. In this investigation it was hypothesized that the DVDs assessed would be led by qualified exercise leaders. However, less than half of the primary GELs leading the workouts possessed any type of credential.

Ironically, the use of Effective Teaching Methods did not appear to be related to the possession of credentials or appropriate educational background. However, credentials were important to safety. The one instructor who labeled herself as a personal trainer, but was not certified through a credentialing agency, scored the lowest on the Safe Instruction and the Effective Teaching Methods subscales. Others with minimal and no certification similarly scored lower on Safe Instruction, whereas those with more certifications and education exhibited superior safety demonstrations.

With the results indicating that warm ups were 4.87 ± 4.52 minutes in duration, this safety factor is of particular concern, and is the area noted where those who were not credentialed scored the worst. Inadequate warm-ups may jeopardize the health of the exerciser, as

warming up has been shown to increase the elasticity of the muscle, thereby reducing the likelihood of muscle tearing. It is critical that exercise DVDs, which can be done alone, provide guidance that is likely to ensure the safety of the exerciser.

Of note, more than half of the DVDs included stretching in the warm-up, but information on whether this was performed prior to or after warming up the muscles was not collected.

Stretching before warming up is a major safety problem. No evaluative statement can be made regarding the inclusion of stretching after the warm-up, as the evidence supporting this practice was inconclusive at the writing of this thesis. Although the majority of the DVDs included stretching in the cool-down, it is concerning that 14 DVDs provided no stretching in the cool-down at all.

Workout efficacy in terms of the workouts' rigor, overall, was good. Other than the "Goddess" workouts, the vast majority of the workouts facilitated a percent maximum heart rate associated with a moderate to vigorous intensity level. While perhaps a bit vigorous for those who are less fit, these levels adhere to all current physical activity intensity recommendations.

Strong workout efficacy should also be evidenced by its practicality in terms of use. Two factors examined in this area were the incorporation of floor exercises, and the duration of the workouts. The Physical Activity Guidelines stated that more research is needed to establish the risks and benefits of various regimens of physical activity in men and women with a body mass index of 35 or greater. DVDs may provide a good solution for this

population, but the use floor exercises may be difficult for this target audience, as well as those who are not fit, who have back problems, arthritis, etc. Most of the DVDs did not include floor exercises, which improves their potential viability for these audiences. In lieu of floor exercises for stretching, Decoster et al. reported that standing and supine hamstring stretches were equally effective at improving flexibility.¹⁵⁰ Evidence in this area is limited, but of critical importance for working with those who experience difficulty doing floor exercises, like stretching.

Ideally, workout durations would be short enough that people would be willing and able to incorporate them into their daily routines, yet long enough to meet the exercise duration recommendations. It is widely known that meeting guidelines to be moderately active for at least 150 minutes per week is challenging. To that end, ten-minute workout DVDs have been designed to appeal to individuals with time constraints. This would seem to be a workable solution since the ACSM stated that cardiorespiratory (aerobic) segments can be done via intermittent aerobic activities throughout the day that add up to 20 to 60 minutes.⁹⁴ According to the 2008 Physical Activity Guidelines, aerobic activity performed in a bout of at least 10 minutes has been shown to improve cardiovascular fitness and some risk factors for heart disease and type 2 diabetes.⁴ Other studies have also documented that intermittent cardiorespiratory segments that last at least ten minutes provide improvements in cardiovascular fitness comparable to longer, continuous segments.^{31, 115, 116, 117}

The fact that there is no discussion of warm-up or cool-down duration requirements to accompany ten minute aerobic bouts makes these recommendations ambiguous and

misleading. It also challenges the efficacy of the 10 minute “workout solutions.” No prescription for warm-up and cool-down durations totaling less than nine minutes have been made by any reputable organization. Thus, it would appear that efficacious DVD workouts should be at least 19 minutes in length.

Study Limitations

There were multiple limitations observed throughout the evaluation of the aerobic exercise DVDs. The research team was comprised of all white women from similar socio-economic and health education backgrounds. Ideally, this study would have been conducted with the target audience, but this was unfeasible for several reasons. The cost of distributing 124 exercise DVDs, along with the liability and the risks of injury associated with vigorous intensity exercise prevented this from being a possibility. To our knowledge, no research assessing exercise DVDs had been conducted at the writing of this thesis, and as such an initial investigation was required before an intervention with the target audience could be conducted.

The reported heart rates for some workouts may have been inaccurate due to the fact that the research team was instructed to walk in place if a workout became too difficult. Further, some of the research team members completed the DVDs in a matter of a few months, while others completed them in spurts over a period of 18 months. These varying patterns resulted in training effect variations.

A random selection process for using the DVDs was considered, but found to be impractical. Also, despite efforts to reduce bias, previous workout history, age, fitness level, etc. likely affected raters' perceptions and survey responses.

Additional limitations were revealed as the survey instruments were used. Most notably, while the contour drawing rating scales initially seemed ideal for evaluating the DVDs' GELs and cast members, researchers discovered that many of the DVDs' GELs and cast members had features that related to two or more drawings. For example, the torso and midsection of a participant's body often resembled one drawing while the lower body resembled another portion. In discussion, researchers discovered that they had unintentionally been using different body sections to determine their final ratings. Further, upon analysis of the questions developed by the research team, it was found that the use of Likert scales elicited sub-optimal inter-rater reliability, diminished the types of future analyses that could be performed, and were less suitable for answering the research questions, than were dichotomous variables.

Despite study limitations it seems clear that the exercise DVDs in this sample had the potential to ameliorate barriers to exercise, but would likely have limited appeal for use with the target audience. In terms of their efficacy, the DVDs exhibited mixed findings.

CHAPTER SIX: CONCLUSIONS

Introduction

The first aerobics video, “Jane Fonda’s Workout,” was released in 1982; and, at the writing of this thesis, over 5,000 exercise videos were available on the market. With a national quest underway to identify means of mobilizing a sedentary population as a strategy to curtail obesity, a study on the practicality, safety, and appropriateness of this resource for use in nutrition education was necessary. A summary of the study findings and implications for future work are presented in this chapter.

Summary of Study Findings

The findings of this investigation supported the notion that exercise DVDs may ameliorate several barriers that prevent urban, limited-resource audiences from being as physically active as they would like to be. DVDs can be performed at home, or in other comfortable and accessible settings where childcare is unnecessary. Further, both DVDs and DVD players are inexpensive, and require little in the way of space and equipment.

However, the exercise DVDs evaluated in this study may have limited appeal for SNAP-Ed participants, as they included mostly thin, White, adult women. Many of the DVDs analyzed were characterized by both intense and complex workouts, and may have limited appeal for limited-resource audiences. However, they should not be discounted in terms of their potential for use with other populations. Nutrition educators and dietitians/nutritionists who

are required to make exercise recommendations to the public may find exercise DVDs to be an excellent solution for the individuals that they counsel. Walking DVDs may be the best option for nutrition educators to recommend. They were characterized by low intensity and complexity and superior adherence to both safety guidelines and national physical activity recommendations for moderate to vigorous activity.

Implications for Future Research

As stated above, exercise DVDs have the potential to be used by dietitians/nutritionists who make exercise recommendations to their clients. However, before nutrition educators and dietitians recommend exercise DVDs to their participants or clients, additional research may be needed.

Formative research should be conducted to determine what factors would make exercise DVDs more appropriate for limited-resource populations. For example, this audience's preferences for GEL and cast member gender, race, body shape, and age is presently unknown. Research assessing these preferences should be conducted, and the results of such work may substantiate a need for the development of new exercise DVDs that are diverse with regard to these aspects. The viability of these DVDs would then need to be tested with the target audience in SNAP-Ed classes.

Future research should also focus on the development of evaluation tools for the assessment of exercise DVDs and better body image scales. The development of a valid and reliable tool

for exercise DVD evaluation would allow nutrition educators to evaluate new DVDs as they become available for purchase. Assessing cast members' body shape for this study was challenging, and pointed to a need to develop better body image scales. New scales should take into account individuals of various cultures and body shapes, and may need to include more than nine drawings per gender in order to accomplish this goal.

When recommending DVDs, safety should be a primary focus. Nutritionists will want to recommend videos that are appropriate for their clients' levels of fitness, that are led by well-trained GELs, and that score highly when rated for safety in a manner similar to the safety subscales used in this work. Most of the DVDs evaluated in this work did not include a fitness level rating on the cover. The inclusion of a recommendation on the DVD cover stating whether the workout is appropriate for a beginner, intermediate, or advanced exerciser would help individuals select a workout that is most appropriate for them. The fact that more than half of the primary GELs evaluated in this work did not possess any credentials may substantiate the need for legislation requiring producers to list the GELs' credentials on the DVD cover, as well.

It may seem to nutrition educators and dietitians that short, ten-minute workout DVDs would be the best recommendation for individuals who cite a lack of time as an exercise barrier. In the case of low intensity ten-minute workouts this may be true since they may not require warm-ups and cool-downs of five and four minutes, respectively. However, the ten-minute workouts evaluated in this work featured high intensity workouts, and may therefore have required warm-ups and cool-downs of this duration in order to ensure safety. Therefore, at

the time of the writing of this thesis, caution was advised when recommending DVDs available for this purpose. There is a clear need for research in the area of how warm-up and cool-down duration requirements for short, high intensity workouts. Based upon these findings, new short duration workout DVDs may need to be developed.

To further accommodate the needs specific to limited-resource audiences, GELs should provide advice for low cost or household options for equipment, i.e., soup cans instead of weights. When designing DVDs to be used in SNAP-Ed classrooms, GELs and producers may want to avoid the use of equipment all together. They should also be sure to include modifications for difficult moves so that individuals of all fitness levels can participate. Additionally, producers should make sure that bad camera angles don't prevent the exerciser from being able to see the GELs' full body when they are teaching a new move.

In conclusion, available exercise DVDs have the potential to reduce exercise barriers, but may have little appeal for diverse, limited-resource audiences. Among the various types of aerobic exercise DVDs, walking DVDs appear to have the greatest potential for success due to their favorable ratings for intensity, complexity, and adequacy of instruction. Finally, even if the DVDs evaluated in this investigation are found to have limited appeal with the target audience, they may be well suited for other populations that dietitians/nutritionists counsel.

Appendix I: Group Exercise Leader Performance Appraisal Tool

EVALUATING GROUP EXERCISE LEADER PERFORMANCE PERFORMANCE APPRAISAL TOOL - GROUP EXERCISE LEADER (GEL)

Name of GEL _____ Name of Supervisor _____
 Date of Class Observation _____ Name of Class _____
 Number of participants attending _____ Date/Time of Class _____
 Reason for Appraisal: Introductory _____ Follow-Up _____ Regular Interval _____

Rate the performance as I, M, E, or NA as follows:

I - Improvement is needed; performance standard is not met

M - Meets performance standard

E - Exceeds performance standard

NA - Not Applicable

Note: **Explanation** sections are available to describe any particular rating.

SECTION 1: IN-CLASS EVALUATION

Behavior-Based Performance	I	M	E	NA
Criterion #1 - Pre-class Conduct				
1. Arrives prior to class time	_____	_____	_____	_____
2. Sets up equipment	_____	_____	_____	_____
3. Greets participants as they arrive	_____	_____	_____	_____
Explanation: _____				
Criterion #2 - Beginning of Class Conduct				
1. Starts class on time	_____	_____	_____	_____
2. Introduces self and class format	_____	_____	_____	_____
3. Welcomes everyone	_____	_____	_____	_____
4. Makes announcements, <i>e.g.</i> , anything related to today's class	_____	_____	_____	_____
5. Encourages participants to exercise at own level	_____	_____	_____	_____
Explanation: _____				
Criterion #3 - Safe Instruction				
Warm-Up				
1. Teaches warm-up which is specifically appropriate for the class	_____	_____	_____	_____
2. Incorporates appropriate duration of warm-up	_____	_____	_____	_____
Stimulus				
3. Teaches appropriate intensity given fitness levels of participants	_____	_____	_____	_____
4. Incorporates proper progression of intensity	_____	_____	_____	_____
5. Incorporates proper progression of complexity	_____	_____	_____	_____
6. Monitors intensity by having participants take their heart rates	_____	_____	_____	_____
7. Monitors intensity by having participants rate via RPE	_____	_____	_____	_____
8. Observes each participant for signs of overexertion	_____	_____	_____	_____
9. Takes proper action if a participant appears to be overexerted	_____	_____	_____	_____
10. Incorporates appropriate duration of stimulus	_____	_____	_____	_____
11. Gradually decreases the intensity of exercises prior to cool-down	_____	_____	_____	_____
Cool-Down				
12. Incorporates appropriate stretching in the cool-down	_____	_____	_____	_____
13. Incorporates appropriate duration of cool-down	_____	_____	_____	_____

EVALUATING GROUP EXERCISE LEADER PERFORMANCE

	I	M	E	NA
Safe Instruction throughout Class				
14. Teaches and demonstrates proper form and execution of exercises	_____	_____	_____	_____
15. Corrects improper form/execution of exercises	_____	_____	_____	_____
16. Demonstrates modifications given various levels of fitness	_____	_____	_____	_____
17. Teaches exercises in an appropriate sequence and progression	_____	_____	_____	_____
18. Avoids contraindicated exercises	_____	_____	_____	_____
19. Avoids patterns/combinations that can contribute to balance/coordination problems	_____	_____	_____	_____
20. Incorporates appropriate number of sets/ reps when teaching muscle strength/endurance exercises	_____	_____	_____	_____
21. Incorporates exercises that utilize a variety of muscle groups	_____	_____	_____	_____
22. Incorporates exercises that provide muscle balance	_____	_____	_____	_____
23. Incorporates exercises to address muscles that are commonly tight and/or weak	_____	_____	_____	_____
24. Incorporates safe transitions, <i>e.g.</i> , standing to non-standing	_____	_____	_____	_____
Explanation: _____				

Criterion #4 - Effective Teaching Methods

1. Uses simple, command or cue words	_____	_____	_____	_____
2. Incorporates proper timing of command or cue words	_____	_____	_____	_____
3. Provides verbal encouragement/positive feedback	_____	_____	_____	_____
4. Utilizes appropriate voice quality including projections, volume, and enunciation	_____	_____	_____	_____
5. Utilizes appropriate nonverbal communication	_____	_____	_____	_____
6. Moves around the room while teaching	_____	_____	_____	_____
7. Uses appropriate music volume	_____	_____	_____	_____
8. Uses appropriate music tempo	_____	_____	_____	_____
9. Selects appropriate music	_____	_____	_____	_____
10. Teaches to the beat of the music; demonstrates proper rhythm	_____	_____	_____	_____
11. Utilizes room space effectively	_____	_____	_____	_____
12. Teaches exercise concepts/principles	_____	_____	_____	_____
Explanation: _____				

Criterion #5 - Class Management

1. Comes to class prepared	_____	_____	_____	_____
2. Demonstrates control and command of the class	_____	_____	_____	_____
3. Uses class time effectively	_____	_____	_____	_____
Explanation: _____				

Criterion #6 - Professionalism

1. Dresses appropriately	_____	_____	_____	_____
2. Demonstrates professional conduct and attitude	_____	_____	_____	_____
3. Supports policies and procedures of the facility	_____	_____	_____	_____
4. Handles equipment properly	_____	_____	_____	_____
Explanation: _____				

EVALUATING GROUP EXERCISE LEADER PERFORMANCE

	I	M	E	NA
Criterion #7 - Interaction with Participants				
1. Uses an appropriate approach when correcting form/execution	_____	_____	_____	_____
2. Shows maturity when dealing with difficult participants	_____	_____	_____	_____
3. Encourages a noncompetitive atmosphere	_____	_____	_____	_____
4. Establishes a positive rapport	_____	_____	_____	_____
5. Incorporates humor appropriately	_____	_____	_____	_____
6. Demonstrates enthusiasm	_____	_____	_____	_____
7. Creates an enjoyable class	_____	_____	_____	_____
8. Welcomes late comers and encourages them to warm-up	_____	_____	_____	_____
Explanation: _____				
Criterion #8 - End of Class Conduct				
1. Ends class on time	_____	_____	_____	_____
2. Thanks participants	_____	_____	_____	_____
3. Gives positive feedback	_____	_____	_____	_____
4. Makes announcements, <i>e.g.</i> , promotes other classes/upcoming events	_____	_____	_____	_____
5. Available to address participant questions/comments	_____	_____	_____	_____
Explanation: _____				
Criterion #9 - Post-class Conduct				
1. Puts away equipment	_____	_____	_____	_____
2. Leaves classroom on time	_____	_____	_____	_____
3. Follows procedures, <i>e.g.</i> , turning off lights, locking door, etc.	_____	_____	_____	_____
Explanation: _____				

SECTION 2: OUT-OF-CLASS-EVALUATION

Behavior-Based Performance

Criterion #1 - Behavior Outside the Classroom

1. Demonstrates dependability regarding teaching responsibilities	_____	_____	_____	_____
2. Makes prior arrangements for class when absent	_____	_____	_____	_____
3. Attends required in-service trainings regarding emergency plan	_____	_____	_____	_____
4. Attends required in-service trainings and meetings	_____	_____	_____	_____
5. Maintains current CPR/AED certification	_____	_____	_____	_____
6. Maintains current First-Aid certification	_____	_____	_____	_____
7. Maintains current GEL certification	_____	_____	_____	_____
8. Available to substitute classes for other instructors	_____	_____	_____	_____
9. Responds to phone/email messages in a timely manner	_____	_____	_____	_____
Explanation: _____				

Trait-Based Performance

Criterion #1 - Communication Traits

1. Demonstrates appropriate interpersonal communication	_____	_____	_____	_____
2. Responds to constructive criticism appropriately	_____	_____	_____	_____
Explanation: _____				

EVALUATING GROUP EXERCISE LEADER PERFORMANCE

	I	M	E	NA
Criterion #2 - Professional/Personal Traits				
1. Demonstrates a positive attitude	_____	_____	_____	_____
2. Demonstrates an unbiased attitude	_____	_____	_____	_____
3. Exhibits creativity	_____	_____	_____	_____
4. Shows a desire to learn	_____	_____	_____	_____
5. Takes responsibility for actions	_____	_____	_____	_____
6. Demonstrates self-motivation	_____	_____	_____	_____
Explanation: _____				

Results-Based Performance

Criterion #1 - Accomplishments Related to Participants

1. Obtained high attendance adherence in classes taught	_____	_____	_____	_____
2. Obtained positive participant evaluations	_____	_____	_____	_____
Explanation: _____				

Criterion #2 - Accomplishments Related to Program/Facility

	Yes	No	In Progress
1. Created a new program or class	_____	_____	_____
2. Improved an operational procedure(s)	_____	_____	_____
3. Developed skills to teach another class or perform another job	_____	_____	_____
Explanation: _____			

Criterion #3 - Professional Accomplishments

1. Obtained additional degree or certification	_____	_____	_____
2. Obtained an award or recognition	_____	_____	_____
3. Attended conferences/workshops for continuing education	_____	_____	_____
Explanation: _____			

SECTION 3: PERFORMANCE APPRAISAL FEEDBACK

Discussion/Feedback Date _____ (Discussed self-performance appraisal, supervisor performance appraisal and developed an action plan).

Action Plan: (Steps to address performance standards rated "I" with a projected timeframe)

General/Positive Feedback:

GEL Signature _____ Date: _____

Supervisor Signature _____ Date: _____

Copy of written Performance Appraisal Tool given to GEL and original placed in GEL Personnel File on _____ (date).

Appendix II: Questions Omitted from GEL Performance Appraisal Tool

Section 1: In-class evaluation

Criterion #1: Pre-class conduct

Arrives prior to class time

Sets up equipment

Greets participants as they arrive

Criterion #2: Beginning of class conduct

Starts class on time

Introduces self and class format

Makes announcements, e.g. anything related to today's class

Criterion #3: Safe instruction

Teaches appropriate intensity given fitness levels of participants

Monitors intensity by having participants take their heart rates

Monitors intensity by having participants rate via RPE

Observes each participant for signs of overexertion

Takes proper action if participant appears to be overexerted

Incorporates appropriate duration of stimulus

Criterion #4: Effective teaching methods

Moves around room while teaching

Utilizes room space effectively

Criterion #5: Class management (all removed)

Comes to class prepared

Demonstrates control and command of the class

Uses class time effectively

Criterion #6: Professionalism (all removed)

Dresses appropriately

Demonstrates professional conduct and attitude

Supports policies and procedures of the facility

Handles equipment properly

Criterion #7: Interaction with participants

Uses an appropriate approach when correcting form/ execution

Shows maturity when dealing with difficult participants

Encourages a noncompetitive atmosphere

Welcomes late comers and encourages them to warm-up

Criterion #8: End of class conduct (all removed)

Ends class on time

Thanks participants

Gives positive feedback

Makes announcements, e.g., promotes other classes/ upcoming events

Available to address participant questions/ comments

Criterion #9: Post-class conduct (all removed)

Puts away equipment

Leaves classroom on time

Follows procedures, e.g., turning off lights, locking door, etc.

Section 2: Out-of-class evaluation (entire section removed)

Appendix III: Outcomes Of Previous Studies That Tested The Validity And Reliability Of The Assessment Instruments Used In This Investigation

Thompson and Gray's Body Image Instrument. Thompson and Gray's body image instrument was tested among a population of female college students.¹⁴¹ The validity of the instrument was tested by having fifty-one female subjects rank both the male and female drawings from thinnest to heaviest. Also, a subsample of the subjects ($n = 32$) selected the drawing which they felt most accurately depicted their current body size. The subjects' responses were strongly correlated with both their reported weights ($0.71, p < 0.0005$), and their BMIs ($0.59, p < 0.0005$). Test-retest reliability for participants' rank-ordering of pictures and their self-ratings were assessed after a one week interval using a sub-sample of the subjects ($n=32$). Responses were strongly correlated ($0.78, p < 0.0005$).

Pulver's Body Image Assessment. A culturally relevant body image assessment tool was developed by Pulvers et al. This instrument's drawings resembled individuals of multiethnic backgrounds.¹⁴³ The investigators tested this instrument for validity and reliability, via three separate studies. In the first study, content validity was established via expert review by medical practitioners. There was a strong correlation ($r = 0.91$) between the medical practitioners' weight classifications of the drawings and the body image figures. In a second study inter-rater reliability, convergent validity, and concurrent validity were assessed. To do so, three research team members used the scale to rate 283 the body sizes for African American men and women. Inter-rater reliability among the researchers was assessed via Cronbach's Alpha, and was, again, high ($\alpha = 0.95$). Body image ratings were strongly correlated with the participants' BMI ($r = 0.89$ to 0.93 across observers and 0.81 for all

participants). Ratings of body image were also strongly correlated with percentage of body fat ($r = 0.77$ to 0.89 across observers and 0.76 for all participants). A third study aimed to: a) assess the instrument's criterion validity by comparing it to two existing body image instruments; and, b) evaluate African Americans' perception of cultural relevance compared to other existing instruments. Results of this work showed that ratings of body image were positively correlated with other validated instruments. Additionally, it was shown that this scale was more culturally acceptable to African Americans than the other instruments. In summary, this body image assessment tool was valid and reliable for examining body image among culturally diverse audiences.

Appendix IV: DVD Constructs of Interest Survey

Your Name/ ID#:

Date:

Name of Video/ Video ID#:

1. At the lowest level of intensity, I would recommend this video for someone who:
 - ① is inactive and has difficulty walking or performing low intensity exercise
 - ② has a low level of fitness and no issues with walking or low intensity exercise
 - ③ has a moderate level of fitness who exercises regularly, but not strenuously
 - ④ has a somewhat high level of fitness who exercises regularly and sometimes vigorously
 - ⑤ has a very high level of fitness, who exercises vigorously almost daily
2. Do you think the directions during the workout were adequate for a person using this video for the first time?

☐ inadequate ☐ somewhat adequate ☐ adequate
3. How do you think the average person would rank the most intense portion of the workout?

☐ low intensity ☐ moderate intensity ☐ high intensity
4. How do you think the average person would rank the most complex portion of the workout?

☐ low complexity ☐ moderate complexity ☐ high complexity
5. Think of the portion of the video when your body felt like it was working its hardest. Rate your Perceived Exertion.

No exert-ion	Extremel y light		Very light		Light		Somewhat hard		Hard		Very Hard		Extremely hard	Maximal exertion
6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

6. How much space is required to use this video?

☐ very little space ☐ moderate amount of space ☐ a lot of space
7. Who does this video appeal to? Check all that apply.

☐ young adults ☐ adults ☐ seniors

8. Rate the overall exercise video on the following:

Criterion #2- Safe Instruction		
#2a: Form		
	I	M
Warm-up		
1. Teaches warm-up which is specifically appropriate for the class		
Stimulus		
2. Incorporates proper progression of intensity		
3. Incorporates proper progression of complexity		
4. Gradually decreases the intensity of exercises prior to cool-down		
Cool-down		
5. Incorporates appropriate stretching in the cool-down		

Comments: _____

#2b: Safe Instruction Throughout the Class			
	I	M	NA
1. Teaches and demonstrates proper form and execution of exercises			
2. Corrects improper form/ execution of exercises			
3. Demonstrates (says or does) modifications given various levels of fitness			
4. Teaches exercises in an appropriate sequence and progression			
5. Avoids patterns/ combinations that can contribute to balance/ coordination problems			
6. Incorporates appropriate number of sets/ reps when teaching muscle strength/ endurance activities			
7. Incorporates exercises that utilize a variety of muscle groups			
8. Incorporates exercises that provide muscle balance			
9. Incorporates exercises to address muscles that are commonly tight and/ or weak			
10. Incorporates safe transitions, e.g., standing to non-standing			

Comments: _____

Criterion #3- Effective Teaching Methods		
	I	M
1. Uses simple command or cue words		
2. Incorporates proper timing of command or cue words		
3. Provides verbal encouragement/ positive feedback		
4. Utilizes appropriate voice quality including projections, volume, and enunciation		
5. Utilizes appropriate nonverbal communication		
6. Uses appropriate music volume		

7. Uses appropriate music tempo		
8. Selects appropriate music		
9. Teaches to the beat of the music; demonstrates proper rhythm		

Comments: _____

Criterion #1- Beginning of class conduct		
	I	M
1. Welcomes everyone		
2. Encourages participants to exercise at own level		
Criterion #4- Interaction with Participants		
	I	M
1. Establishes a positive rapport		
2. Incorporates humor appropriately		
3. Demonstrates enthusiasm		
4. Creates an enjoyable class		

Comments: _____

1st Group Exercise Leader (GEL)

- The GEL's age category is:
☐ young adult ☐ adult
- The GEL's race is:
☐ White (non-Hispanic) ☐ Black (non-Hispanic) ☐ Hispanic ☐ Asian/ Pacific Islander
- The GEL's gender is:
☐ female ☐ male
- What is the GEL's body shape? Place a check under the correct number.

0	1	2	3	4	5	6	7	8	9

Other GELs

- How many other GELs fall into each age category?
 ____ young adult ____ adult
- How many other GELs fall into each race category?
 ____ White (non-Hispanic) ____ Black (non-Hispanic) ____ Hispanic ____ Asian/
 Pacific Islander

3. How many other GELs of each gender are there?

___ female ___ male

4. What were the other GELs body shapes? Record the number of each below.

0	1	2	3	4	5	6	7	8	9

Heart Rate

- What is your Resting Heart Rate?
- What is your Target Heart Rate range for exercise? ___ to ___
- $\frac{1}{2}$ to $\frac{3}{4}$ of the way through the video when you feel that you're working hard, take your heart rate. If you find the workout gets harder, repeat. What is your max heart rate? ___

Cast Members

How many participants were there? (you will fill out their information later)

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14+

- If there were more than 14 participants, what age category were they?
☐ all young ☐ all adult ☐ all senior ☐ mixed
- If there were more than 14 participants, what race were they?
☐ all White (non-Hispanic) ☐ all Black (non-Hispanic) ☐ all Hispanic
☐ all Asian (Oriental) ☐ all from India ☐ all too difficult to discern ☐ mixed
- If there were more than 14 participants, what gender were they?
☐ all women ☐ all men ☐ mixed
- If there were more than 14 participants, what body shapes did they have?
☐ all lean ☐ all average ☐ all overweight ☐ mixed

The following section will be completed to individually assess Participants 1- 14.

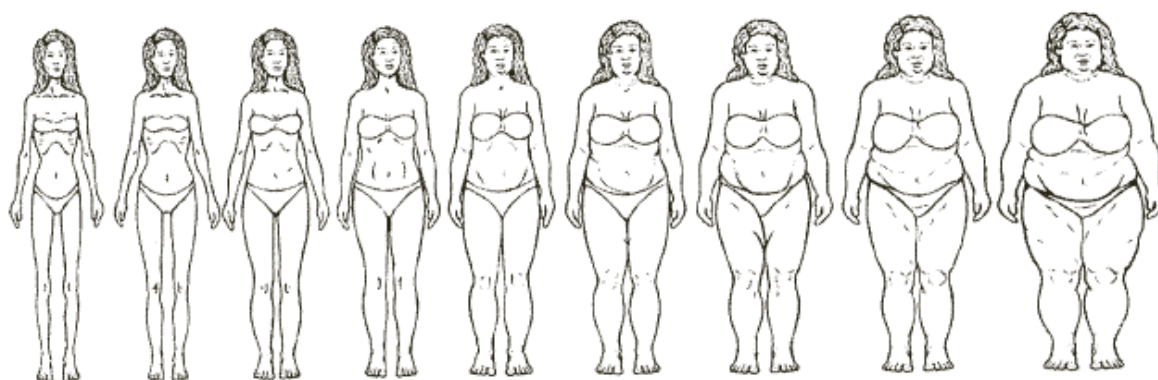
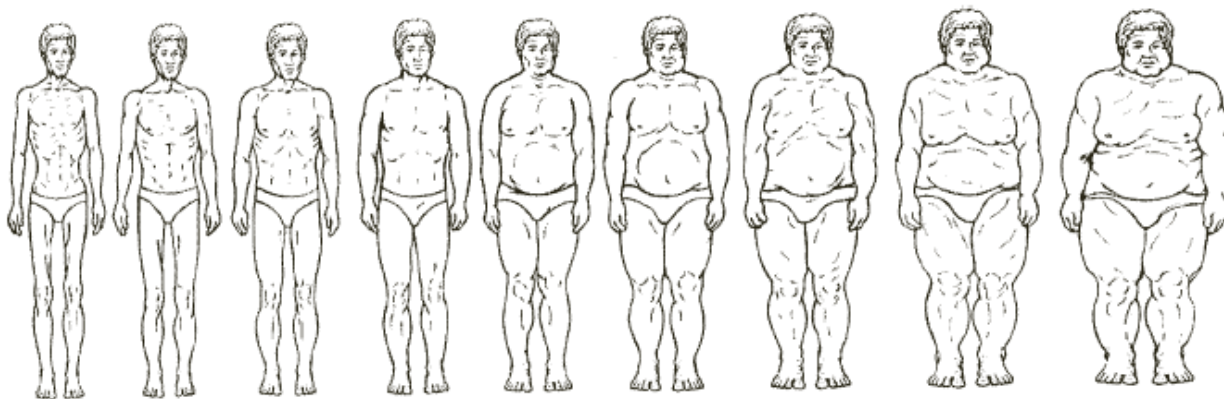
(From this portion on, the website designed for this data collection showed these pages according to the number of participants identified.)

Participant 1:

- Participant 1's age category is:
☐ young adult ☐ adult ☐ senior
- Participant 1 is:

- ☐ White (non-Hispanic) ☐ Black (non-Hispanic) ☐ Hispanic
☐ Asian (Chinese, Japanese) ☐ from India ☐ Too difficult to discern

3. Participant 1 looks like:



Pregnant

Appendix V: DVD Attributes Survey

Video Name/ ID#: _____ **Year:** _____

Length of Video (listed on DVD): _____

Group Exercise Leader(s)

1. Name of GEL(s): _____

2. What are the GEL's credentials? Check all that apply.

- ☐ Personal Trainer (PT)
- ☐ Aerobics Instructor (GEL)
- ☐ College
- ☐ ACSM
- ☐ ACE
- ☐ AFAA
- ☐ Dancer/ Dance Instructor
- ☐ Pilates
- ☐ Cooper Institute
- ☐ Martial Arts
- ☐ Awards

Clothing

1. Describe the clothing worn by the GEL(s) and participants:
- ☐ Matching
 - ☐ Unmatching

Workout

1. How long was the warm-up?
2. Was there stretching in the warm-up?
 - ☐ Yes
 - ☐ No
3. How long was the workout?
4. How long was the cool-down?
5. Was there stretching in the cool-down?
 - ☐ Yes
 - ☐ No

6. Were there floor exercises?
☐ Yes ☐ No
7. Did the instructor have the participants monitor their heart rates?
☐ Yes ☐ No
8. Did the instructor have the participants monitor their RPE?
☐ Yes ☐ No

Props

1. Were any of the following props used? If yes, please name them.
- ☐ Weights
 - ☐ Chair
 - ☐ Resistance band
 - ☐ Step
 - ☐ Transfirmer
 - ☐ Mat
 - ☐ Other

Setting

1. Describe the setting of the video:
- ☐ workout studio
 - ☐ the beach
 - ☐ normal home
 - ☐ mansion
 - ☐ other

Appendix VI: DVDs Evaluated in this Investigation

1. 10 Minute Solutions- Workouts to Shape Up Your Whole Body
2. 10 Minute Solutions- Kickbox Bootcamp
3. Belly Dance fitness for weight loss- cardio shimmy
4. Belly Dance fitness for weight loss- Hip drop hip hop
5. Belly Dance fitness for weight loss- pure sweat
6. Belly Twins Belly Dance Core Conditioning with Neena and Veena
7. Belly Twins Indi-hop with Neena and Veena
8. Big Butts Hit the Beach
9. Billy Blanks- Ab Boot Camp
10. Billy Blanks- Basic Training Boot Camp
11. Billy Blanks- Fat Blasting Cardio
12. Billy Blanks Tae Bo Capture the Power- Strength and Power
13. Billy Blanks- Tae Bo Cardio Circuit 1 and 2
14. Billy Blanks- Tae Bo Contact 1
15. Billy Blanks- Tae Bo Foundation and energy
16. Billy Blanks- Tae Bo total Body Fat Blaster
17. Billy Blanks- Ultimate Boot Camp
18. Body Wisdom- Ultimate Body Beginning workouts for weight loss
19. Body Wisdom- Ultimate Body- Challenging Workouts for Weight Loss
20. Cardio Burn for Weight Loss/ Get Moving! Walking for Weight Loss
21. Cardio Pilates with Ana Caban
22. Carmen Electra's Lap Dance and Hip Hop- Disks 4 and 5
23. Cindy Crawford - New Dimensions
24. Cindy Crawford - The next challenge workout
25. Crunch - Boot Camp training
26. Crunch - Burn and Firm Pilates with Ellen Barrett
27. Crunch - Cardio Dance Blast with Marie Forleo
28. Crunch - Cardio Salsa
29. Crunch - Fat Burning Ab Attack with Catherine Chiarelle
30. Crunch - Fat Burning Dance Party
31. Dance off the Inches - 15 Minute Express
32. Dance off the Inches - Calorie Blasting Party
33. Debbie Siebers- Slim in 6- 6 week Body Slimming System
34. Denise Austin - Blast Away the Pounds Indoor Walk
35. Denise Austin - Burn Fat Fast Cardio Dance and Sculpt
36. Denise Austin - Ultimate Fat Burner
37. Denise Austin- Blast Away 10 Pounds
38. Denise Austin -Personal Training System
39. Denise Austin Power Zone- The Ultimate Metabolism Boosting Workout
40. Double Pump Total Body
41. Extreme Makeover Fitness
42. Fat Burning Kickboxing Workout for Dummies
43. Fat Burning Workout For Dummies with Gay Gasper
44. Gilad- The New Best of Bodies in motions Abs workout

45. Goddess Workout Intro to belly dance for fitness
46. Goddess Workout- Veils
47. Goddess Workout- The Warrior Goddess
48. Hula Workout for beginners with Kili
49. Jane Fonda Collection Complete Personal Trainer series
50. Jane Fonda Collection Complete Workout and stress relief program
51. Jazzthetics Fitness
52. Jeff Costa's Cardio Striptease
53. Jillian Michaels- Cardio Kick Boxing
54. Jillian Michaels- Maximize
55. Jillian Michaels- Shape Up Complete Front and Backside
56. Karen Voight - Ultimate step circuit
57. Karen Voight - Calorie Burn
58. Karen Voight - Energy Sprint
59. Karen Voight- Slim Physique
60. Kari Anderson- Go
61. Kari Anderson- Push
62. Kathy Kaehler Basics- Total Fitness Workout
63. Kathy Kaehler- Workout Class
64. Kathy Smith - Fat burning breakthrough
65. Kathy Smith - Latin Rhythm workout
66. Kathy Smith - moving through menopause
67. Kathy Smith - Personal Trainer Total Body Workout
68. Kathy Smith - Power step
69. Kathy Smith - the rules of fat burning
70. Kathy Smith - Timesaver cardio fat burner
71. Kathy Smith - Weight loss
72. Kathy Smith- Super Slimdown Circuit
73. Kathy Smith's Step Workout
74. Keeping fit in your 50s- Aerobics
75. Kick Butt- Push Pull and steamin cardio
76. Latin Grooves: Workout
77. Leslie Sansone- 2 mile Walk
78. Leslie Sansone- Deluxe walk aerobics
79. Leslie Sansone- Special Edition Fat Burning Walk- 2 miles
80. Leslie Sansone- Fat Burning Walk- 4 miles
81. Leslie Sansone- Miracle Mile Walk
82. Leslie Sansone- Muscle Mile One
83. Leslie Sansone- Older adults walk & firm
84. Leslie Sansone- Power Mile
85. Leslie Sansone- The Walk Diet 1 and 2 miles
86. Leslie Sansone- Walk aerobics for Seniors
87. Leslie Sansone- Walk Away the pounds
88. Leslie Sansone- Walk Away the Pounds Super Fat Burning 3 Miles
89. Leslie Sansone- Walk Away the Pounds Express- Super Challenge 4 mile
90. Leslie Sansone- Walk & Jog

91. Leslie Sansone- Walk & Kick
92. Leslie Sansone- Walk Strong
93. Mia St. John Million Dollar Workout
94. MissFit
95. Paul Abdul Cardio Dance
96. Prevention- Dance it Off With Jennifer Galardie
97. Prevention- Fitness Systems 3-2-1 Workout
98. Prevention- Walk your way slim
99. Quickfix- Cardio Hip-Hop Workout
100. Dance Fitness for Beginners- Daily Quickies- 10 minute workouts
101. Richard Simmons and the Silver Foxes
102. SELF- Slim and Sleek Fast
103. Shape Cardio Workout: Bikini Body All Year-Round
104. Shape Your Butt, Hips, and Thighs
105. Stott Pilates - The Secret To Weight Loss Volume 1
106. Sweating in the Spirit- Donna Richardson
107. The Biggest Loser Workout
108. The Firm- The Transfirmer Series- Ultimate Calorie Blaster
109. The Firm- Aerobic Body Shaping
110. The Method- AfroBrazilian cardio
111. The Method- Cardio Bootcamp
112. The Method- Cardio Flex Band Workout
113. The Method- Dance to Fitness
114. The Method- Pilates All in One Workout
115. The New Method 20/20- Cardio Kick
116. Tighter Assets- Cardio Blast- Tamilee Webb
117. Tighter Assets- Weight Loss- Tamilee Webb
118. Trainer's Edge- Cardio Interval Training with Petra Kolber
119. Ultimate Body Makeover with Frederique
120. Urban Heat- Hip Hop Workout
121. Victoria Johnson- Cardio Dance Jam
122. Victoria Johnson- Cardio Dance Party
123. Walk it Off With George Circuit Walk
124. Walk it Off with George Walk and Box

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