

INFLUENCE OF DEMOGRAPHIC, PSYCHOSOCIAL, PHYSIOLOGICAL AND
SOCIOCULTURAL VARIABLES ON EXERCISE ADHERENCE AMONG
AFRICAN AMERICANS ENROLLED IN THE FIT 4 LIFE STUDY

A Dissertation
Submitted to
The Temple University Graduate Board

In Partial Fulfillment
of the Requirements for the Degree
DOCTOR OF PHILOSOPHY

By
Amanda M. Perkins

August 2012

Examining Committee Members:

Michael L. Sachs, PhD, Advisory Chair, Kinesiology
Michael D. Brown, PhD, Kinesiology
Joseph P. DuCette, PhD, Educational Psychology
Catherine C. Schifter, PhD, Curriculum, Instruction, and
Technology in Education

©

Copyright

By

Amanda M. Perkins

2012

All Rights Reserved

ABSTRACT

Influence of demographic, psychosocial, physiological and sociocultural variables on exercise adherence among African Americans enrolled in the Fit 4 Life study

By Amanda M. Perkins

Doctor of Philosophy

Temple University, 2012

Doctoral Chair: Michael Sachs, PhD

Exercise adherence is fundamental in the management of hypertension and other chronic diseases. The purpose of this study was two-fold. The first purpose was to examine patterns of adherence and to describe the influences of demographic, psychosocial, physiological, and sociocultural variables on adherence among African Americans enrolled in the Fit 4 Life study. The second purpose was to determine follow-up exercise behaviors of participants previously enrolled in the Fit 4 Life study.

A mixed-methods approach was used with questionnaires and semi-structured interviews. A total of 75 African Americans (mean age = 51.8) who were previously enrolled in the Fit 4 Life study completed a several measures, which included a demographic questionnaire, psychosocial measures (SOC - Short Form; EBBS; BARSE; MHLC - Form C; SLS), and physiological tests (e.g., BMI, blood pressure, fasting

glucose, cholesterol). Nine semi-structured interviews were conducted with exercise adherers (n = 5) and non-adherers (n = 4) who returned the questionnaires.

Interviews were analyzed using thematic analysis and resulted in the emergence of four themes, and 10 associated subthemes, which described the participants' perceptions of exercise, their environment, and how these elements influence exercise behavior. The major themes were: *benefits, barriers, facilitators, African American*. Analysis revealed that adherers were able to identify greater physical activity benefits, and developed strategies to overcome barriers to exercise, including finding sources of social support outside of their friends and family. Adherers were also more likely to view self-efficacy as a benefit of exercise, as well as view exercise as an opportunity to focus on themselves.

Through a series of chi-square analyses and independent samples t-tests, quantitative results revealed that adherers lived in smaller households and worked part-time. Adherers also had lower diastolic blood pressures, weighed less, had lower resting metabolic rates, less fat mass, and lower BMIs than non-adherers. Finally, adherers perceived fewer barriers to exercise, and had greater life satisfaction than non-adherers.

TABLE OF CONTENTS

	Page
ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	viii
LIST OF TABLES.....	x
LIST OF FIGURES.....	xi
CHAPTER	
1. INTRODUCTION.....	1
Significance of the Study	9
Statement of the Problem	9
Specific Aims and Research Questions	10
Delimitations	11
Limitations	12
Definition of Terms	13
2. REVIEW OF LITERATURE.....	17
Hypertension and African Americans	17
Hypertension and Exercise	21
Determinants of Exercise Adherence	25
Culture and Health Behaviors	34
African Americans' Exercise Behavior	36
The Biopsychosocial Model	42
Summary	48
3. METHODOLOGY.....	50
Research Design	50
Participants	52
Procedures	55
Exercise Intervention	59
Exercise Adherence	60
Interviews	62
Instrumentation	64
Quantitative	64
Demographic Data.....	64
Exercise Stages of Change -	
Short Form (SOC).....	65
Exercise Benefits/Barriers Scale (EBBS)...	66
Barriers Self-Efficacy Scale (BARSE).....	66

	Multidimensional Health Locus of Control Scale - Form C (MHLC)	67
	Satisfaction with Life Scale (SLS)	68
	Qualitative	69
	Interviews	69
	Author as Instrument	71
	Data Analysis	74
4.	RESULTS AND DISCUSSION	77
	Results for Primary Aim 1	77
	Results for Research Question 1.1	79
	Participant Demographic Information	79
	Differences between Adherers and Non-adherers	79
	Results for Research Question 1.2	80
	Participant Psychosocial Data	80
	Results for Research Question 1.3	87
	Participant Physiological Data	89
	Differences between Adherers and Non-adherers	90
	Results for Primary Aim 2	93
	Theme 1 - Benefits of Exercise and Physical Activity	95
	Cognitive/Mental Benefits of Exercise and Physical Activity	96
	Physical Benefits of Exercise and Physical Activity	99
	Theme 2 - Barriers to Exercise and Physical Activity	100
	Personal Barriers	100
	Community Barriers	105
	Study Barriers	109
	Theme 3 - Facilitators of Exercise and Physical Activity	111
	Personal Facilitators	112
	Study Facilitators	114
	Theme 4 - African American	119
	Cultural Characteristics	120
	Culturally Specific Barriers	123
	Community Outreach	127
	Results for Secondary Aim	128
	Results for Research Question 3	129

Differences in Participant Exercise Behavior at Follow-up.....	129
Discussion of Research Questions	130
Specific Aim 1	130
Research Question 1.1.....	130
Research Question 1.2.....	132
Research Question 1.3.....	140
Specific Aim 2	142
Research Question 2.1.....	142
Research Question 2.2.....	147
Research Question 2.3.....	151
Secondary Aim	153
General Discussion	156
Implications for Researchers	160
Implications for Practitioners	165
5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH.....	169
Summary	169
Conclusions	172
Recommendations for Future Research	174
REFERENCES CITED.....	178
APPENDICES	
A. Fit 4 Life Study Consent Form.....	200
B. Recruitment Script.....	214
C. Interview Consent Form.....	215
D. Cover Letter.....	219
E. Aerobic Exercise Training Program.....	220
F. Demographic Questionnaire.....	221
G. Exercise Stages of Change - Short Form (SOC).....	223
H. Exercise Benefits/Barriers Scale (EBBS).....	224
I. Barriers Self-Efficacy Scale (BARSE).....	226
J. Multidimensional Health Locus of Control Scale - Form C (MHLC).....	228
K. Satisfaction with Life Scale (SLS).....	230
L. Interview Guide.....	231
M. Raw Data Theme Counts for Adherers and Non-adherers.....	234

ACKNOWLEDGEMENTS

I would not have been able to complete this dissertation without the help, encouragement, and support of many people. Dr. Sachs, thank you for your guidance throughout the past four years. I am especially grateful for all of the wisdom you shared with me and the compassion you showed me during the past year, as I was preparing to close one chapter of my life and begin another.

Dr. Brown, thank you for taking me under your wing and allowing me to be a member of the HyMAP Lab. Your constant support, as well as your enthusiasm for my research and belief in my abilities, has opened up numerous opportunities for me and for that I am grateful.

Drs. Schifter and DuCette, thank you for taking the time out of your busy schedules to serve on my committee. You have both taught me much more about data analysis throughout this process, than I could have imagined.

I want thank my HyMAP friends and colleagues for their help and support. I wish you all the best. I also want to thank my friend and colleague, Aaron Ross for his friendship and endearing cynicism. Also, this study would not have been possible without the participants. I thank you all so much for taking the time to allow me to

interview you. Your support and encouragement has meant a great deal.

God could not have blessed me with better parents. Mom and Dad, you all have constantly supported me throughout this long journey, and believed in any decision I made along the way. You believed in me when I didn't believe in myself, prayed for me, bragged about me to friends and strangers, and supported me in every way imaginable. I could not feel more loved. Avonne, BJ, Cara, and Tiffany, I couldn't ask for better, more supportive friends. Alan, thank you for supporting me and listening to each and every one of my complaints over the past year. I know you had no idea what you were getting yourself into.

LIST OF TABLES

1. Blood Pressure Classifications for Adults	18
2. Determinants of Exercise Adherence	27
3. Fit 4 Life Participant Demographic Information ...	79
4. Adherence and Household Size Frequencies	79
5. Adherence and Occupational Status Frequencies	79
6. EBBS Benefits, Barriers, and Total Means	82
7. Adherer and Non-adherer Means and Standard Deviations for Exercise Benefits (EBBS) Items	83
8. Adhere and Non-adherer Means and Standard Deviations for Exercise Barriers (EBBS) Items	84
9. Barriers Self-Efficacy Scale (BARSE) Means	85
10. Multidimensional Health Locus of Control (MHLIC) Subscale Means	85
11. Adherer and Non-adherer Means and Standard Deviations for Satisfaction with Life Scale (SLS) Items	86
12. Physiological Characteristics of Fit 4 Life Participants	88
13. Independent t-tests Comparing Physiological Characteristics of Adherers and Non-adherers	89
14. Interview Participants' Demographic Information ..	92
15. Stage of Change for Adherers and Non-adherers ...	125

LIST OF FIGURES

1. Hierarchical Continuum Illustration of the Biopsychosocial Model.....	43
2. Kaleidoscope Framework of Determinants of Physical Activity.....	45
3. Participants' perceived benefits of exercise.....	94
4. Participants' perceived barriers of exercise.....	99
5. Participants' facilitators of exercise.....	113
6. Participants' perceptions of being African American.....	119
7. Highest level of education obtained among adherers and non-adherers.....	127
8. Household income for Fit 4 Life participants.....	128
9. Employment status for Fit 4 Life participants.....	128

CHAPTER 1

INTRODUCTION

Hypertension, a modifiable risk factor for cardiovascular disease, affects 76.4 million people in the United States (American Heart Association, 2012). According to the National Center for Health Statistics (Ostchega, Yoon, Hughes, & Louis, 2008), nearly one-third (31.3%) of U.S. adults has hypertension, and an additional 25% suffer from prehypertension, a condition which raises one's risk of developing the aforementioned disease (Lloyd-Jones et al., 2009). African Americans suffer from disproportionate rates of hypertension, compared to other racial or ethnic groups in the United States, with a prevalence of approximately 41%. Roughly 28% of Caucasians are hypertensive (Hertz, Unger, Cornell, & Saunders, 2005). In addition to a higher prevalence, hypertension among African Americans tends to develop earlier in life and be more severe, in comparison to Caucasians (AHA, 2012; Lloyd-Jones et al., 2009). Hypertension is associated with increased risk of heart attack, stroke, heart failure, and kidney disease (Centers for Disease Control and Prevention, 2011; JNC7, 2004), and African Americans are more likely to

experience a fatal stroke or die from heart disease (AHA, 2012).

Numerous determinants exist for the development of hypertension, including age, ethnicity, level of education, socioeconomic status, family history, genetic factors, weight, stress, level of physical activity, and diet (Lloyd-Jones et al., 2010). While numerous modifiable and non-modifiable risk factors exist for the condition, researchers and practitioners agree that the adoption of a healthy lifestyle (i.e., eating a healthy/low sodium diet, achieving a healthy weight, engaging in regular physical activity, consuming moderate amounts of alcohol, and eliminating tobacco use) is essential for the prevention of hypertension and is a vital component of its management (JNC7, 2004).

Physical inactivity is a modifiable risk factor for the development of hypertension, as well as other chronic diseases, including cardiovascular disease, Type II diabetes, obesity, osteoporosis, and colon and breast cancers (American College of Sports Medicine, 2009; Blair Cheng, & Holder, 2001; Warburton, Nicol, & Bredin, 2006). The benefits of engaging in regular physical activity include prevention and attenuation of these diseases, as well as a reduction in overall mortality rates (CDC, 1999).

Physical activity participation also elicits mental health benefits such as improved mood states, reduced symptoms of depression and anxiety (De Moor, Beem, Stubbe, Boomsma, & De Geus, 2006; Paluska & Schwenk, 2000), improved cognitive functioning (Colcombe & Kramer, 2003; Lautenschlager et al., 2008), increased self-esteem (Fox, 2000), and enhanced health-related quality of life (Courneya et al., 2003).

In regard to hypertension specifically, regular mild to moderate intensity aerobic exercise decreases blood pressure in approximately 75% of individuals with the condition (Hagberg, Park, & Brown, 2000; Kokkinos & Papademetriou, 2000), and provides protective effects for normotensive individuals (Wallace, 2003). In addition to reductions in blood pressure, aerobic exercise training improves several other risk factors for cardiovascular disease, such as improvements in cholesterol, weight loss, and increased insulin sensitivity (Hagberg et al., 2000).

As noted previously, aerobic exercise performed at mild to moderate intensities is recommended for the prevention and attenuation of hypertension. While participating in a consistent aerobic exercise program is optimal, regular physical activity has been shown to elicit some health benefits (U.S. Department of Health and Human Services, 2008). According to the U.S. Department of

Health and Human Services (2008), healthy adults should accumulate at least 150 minutes of moderate-intensity aerobic physical activity, or a minimum of 75 minutes of vigorous activity, each week. Despite this recommendation, physical activity participation rates among American adults are disconcerting. According to the Centers for Disease Control and Prevention (2010a), approximately 25% of adults do not engage in any leisure-time physical activity.

Associations between level of physical activity and age, gender, education, and race/ethnicity have been established. In regards to age, 19.1% of Americans ages 18-24, compared to 32.7% of older adults (ages 65 and older) do not engage in leisure-time physical activity (CDC, 2010b). In 2008, 42.3% of adults who did not acquire a high school diploma, compared to 15.4% of college graduates, did not engage in leisurely physical activity, illustrating the salience of education as a determinant for physical activity behavior (CDC, 2010c). Men are slightly more active than women, with 21.7 and 26.2%, respectively, not engaging in leisure activity (CDC, 2010d). Finally, 31.9% of African Americans, compared to 22.2% of Caucasians, reported no leisure-time physical activity (CDC, 2010e). When examining physical activity participation rates, it is important to consider that

participation involves the processes of adopting and maintaining activity.

Adherence to exercise is poor among general and clinical populations. Researchers have found that approximately 50-65% of people beginning an exercise program will drop out within 3 to 6 months (Annesi & Unruh, 2007; Buckworth & Dishman, 2002; Courneya, Estabrooks, & Nigg, 1997; Dishman & Buckworth, 1996). These statistics are alarming, particularly because exercise adherence is fundamental in evaluating physiological or psychological effects of exercise, assessing the efficacy of exercise interventions, and in the management of chronic diseases (Marcus et al., 2000; Woodard & Berry, 2001).

Researchers have investigated the known determinants of exercise adherence for decades. In most cases, the term determinant indicates a reliable or predictive relationship, but does not imply causation (Dishman, Sallis, & Orenstein, 1985). Identifying determinants is valuable because it acknowledges the wide range of factors that may influence an individual's exercise and physical activity behavior. Further, it may help specify which segments of the population may need to be targeted in research interventions (Dishman et al., 1985).

Determinants of adherence are typically divided into six

categories: (a) demographic and biological, (b) psychological, cognitive, and emotional, (c) behavioral attributes and skills, (d) social and cultural, (e) physical environmental, and (f) physical activity characteristics (Troost et al., 2002). Age and gender are demographic/biological variables that have been consistently correlated to physical activity. Men are typically more physically active than women, and level of activity and age are inversely related (Troost et al., 2002; Weinberg & Gould, 2010). Relationships between physical activity and demographic/biological variables such as race/ethnicity, body mass index, and education have also been established.

Examples of psychological, cognitive, and emotional determinants of adherence are barriers to exercise, exercise self-efficacy, knowledge, attitudes, and exercise intention. Exercise self-efficacy is the strongest determinant of exercise behavior (Troost et al., 2002), whereas a strong inverse relationship exists between barriers to exercise and exercise behavior. Behavioral attributes and skills include variables such as smoking, past exercise behavior, dietary habits, and skills for coping with barriers. Social and cultural determinants include peer and family support, and group cohesion.

Physical environmental determinants include variables such as actual and perceived access to facilities, traffic, terrain, and qualities of the exercise leader. Finally, physical activity characteristics include variables such as intensity, duration, and perceived effort (Dishman, Sallis, & Orenstein, 1985; Trost et al., 2002; Weinberg & Gould, 2010). It is important to note that determinants are not isolated variables; rather, they influence and are influenced by other determinants (Dishman et al., 1985).

Adherence to exercise programs is influenced by perceived barriers and benefits to participation (Sechrist, Walker, & Pender, 1987) and these constructs are integral to various models of behavior change in a physical activity context, such as the transtheoretical model (Prochaska & Velicer, 1997), the health belief model (Rosenstock, 1990), the theory of planned behavior (Ajzen, 1991), and social cognitive theory (Bandura, 1986). Lack of time and inaccessibility are the most commonly cited barriers to not initiating and adhering to exercise programs (Dishman, 2001), whereas improvements in health and fitness are commonly cited benefits to participation (Sechrist et al., 1987).

African Americans experience exercise benefits and barriers similar to other racial/ethnic groups in the

United States; however, given their lower physical activity participation rates and higher rates of chronic disease, continued research in this area is warranted. Some of the distinguishing barriers experienced by African Americans may include unsafe neighborhoods, hair maintenance, familial and communal responsibilities, and cultural values and beliefs (Banks-Wallace, 2000; Griffith, Gunter, & Allen, 2011; Siddiqi, Tiro, & Shuval, 2011). Although not explicitly studied in relation to exercise behavior, sociocultural constructs such as ethnic identity, medical mistrust, religiosity, collectivism, time orientation, and perceived racial discrimination, have also been associated with health benefits and practice among African Americans (Harvey & Afful, 2011; Kreuter et al., 2003; Lukwago et al., 2001).

A valuable framework for studying exercise adherence is the biopsychosocial model (Engel, 1977; 1980). While the biopsychosocial model emerged out of a need to move from a disease model to a more progressive model of care, it provides noteworthy inferences for researchers and practitioners concerned with the prevention of disease. The model takes into account biophysical influences (e.g., age, aerobic capacity, genetics, blood pressure), psychocognitive influences (e.g., self-efficacy, well-

being, emotions), as well as social influences (e.g., friends, family, community) (Lindau et al., 2003).

Significance of the Study

This study contributes to the existing literature on adherence to exercise, particularly among African Americans, because it acknowledges that adherence is a complex phenomenon, involving interactions among the individual, the environment, and the community (Martin et al., 2000; Mihalko et al., 2004). Further, this study is informed by the biopsychosocial model, thereby acknowledging that social determinants of physical activity occur in a biocultural context (Dishman, 2001).

Exploring cultural influences may be particularly useful in studying the health behaviors of African Americans, and can inform the development of successful, culturally-tailored interventions (Harvey & Afful, 2011). A comprehensive understanding of exercise adherence among participants is sought in this study, which has the potential to make this and similar interventions more effective, and ultimately diminish chronic health disparities related to physical inactivity.

Statement of the Problem

The purpose of this study was two-fold. The first purpose was to examine patterns of adherence and to

describe the influences of demographic, psychosocial, physiological, and sociocultural variables on adherence among African Americans enrolled in the Fit 4 Life study. The second purpose was to determine follow-up exercise behaviors of participants previously enrolled in the Fit 4 Life study.

Specific Aims and Research Questions

The following specific aims and corresponding research questions were addressed in this study:

Primary Aim 1. To examine patterns of adherence among participants in the Fit 4 Life study and describe the relationship between demographic, psychosocial, and physiological variables and exercise adherence.

Research Question 1.1. How do adherers and non-adherers differ in demographic characteristics?

Research Question 1.2. How do adherers and non-adherers differ in psychosocial characteristics?

Research Question 1.3. How do adherers and non-adherers differ in physiological characteristics?

The second primary aim of this study was exploratory in nature; therefore, it is likely to generate information that may be used to develop future research questions.

Primary Aim 2. To explore the roles of culture and social context in the process of exercise behavior change for participants in the Fit 4 Life study.

Research Question 2.1. What are barriers to exercise among adherers and non-adherers?

Research Question 2.2. What are facilitators to exercise among adherers and non-adherers?

Research Question 2.3. How do cultural factors influence decisions related to exercise behavior?

Secondary Aim. To determine follow-up behaviors of participants previously enrolled in the Fit 4 Life study.

Research Question 3. Is there a significant difference between exercise behavior (stage of change) at follow-up between adherers and non-adherers?

Delimitations

This study was delimited as follows:

1. Participants were African Americans men and women age 40-75 living in the greater Philadelphia metropolitan area.
2. Participants were part of a larger study examining the role of exercise and genetics on hypertension.
3. Qualitative data were collected on a small subsample of participants.

4. The study (e.g., testing and structured exercise) occurred in a controlled lab environment.

Limitations

The following limitations were present in this study:

1. Many of the assessments were self-report; therefore, there is a possibility that participants did not answer questionnaires correctly or honestly.

2. Participants may have been aware of socially accepted responses to questionnaire and interview subject matter.

3. Participants in this study responded to an advertisement for addressing high blood pressure; therefore, participants may have been particularly concerned about blood pressure compared to those who did not inquire about the study.

4. Men comprised a small number of the sample in this study.

5. The time elapsed between completion or exclusion from the study and follow-up was not consistent among participants.

6. Qualitative and quantitative data were collected from a relatively small sample size; therefore, findings may not be generalizable to other populations.

Definition of Terms

The following are definitions for terms in this study:

Biopsychosocial model. The biopsychosocial model is a scientific model for studying health or illness, in which biological, psychological, and social factors all play a significant role. The model has influenced the emergence of testing social cognitive constructs in the engagement and persistence in healthy behaviors (Engel, 1977; 1980; Lindau et al., 2003).

Collectivism. Collectivism is the belief that the basic unit of society is the family, and not the individual. Collectivism is a construct demonstrated to be prevalent among African Americans, and is associated with health-related beliefs and practices (Kreuter et al., 2002; Lukwago et al., 2001; Nobles, 1991).

Exercise. Exercise, a subcategory of physical activity, is defined as planned, structured, repetitive bodily movement done to improve or maintain one or more components of physical fitness (i.e., cardiorespiratory endurance, muscular endurance, muscular strength, body composition, and flexibility) (Caspersen, Powell, & Christenson, 1985).

Exercise adherence. Exercise adherence refers to the degree to which individuals stick with their exercise

programs. Exercise adherence in this study is measured two ways: (1) rate of progression through the prescribed exercise program, and (2) number of sessions attended out of number of possible sessions.

Exercise self-efficacy. Exercise self-efficacy is the belief that one is capable of successfully adopting and maintaining a regular exercise regimen in the face of barriers to participation (McAuley, 1992).

Hypertension. Hypertension, commonly referred to as high blood pressure, is a chronic medical condition in which the systemic arterial blood pressure is elevated, indicating that the heart is working harder than it should. According to the JNC7 (2004), normal blood pressure is classified as <120/80. Stage 1 Hypertension is a systolic blood pressure of 140-159 mm Hg or a diastolic blood pressure of 90-99.

Physical activity. Physical activity is defined as any bodily movement produced by the skeletal muscles that results in energy expenditure. Physical activity is typically categorized as sleep, occupational, sports, conditioning, leisure-time, or household activities (Caspersen, Powell, & Christenson, 1985).

Prehypertension. A systolic blood pressure of 120-139 mm Hg or diastolic blood pressure of 80-89 mm Hg (JNC7,

2004). Lifestyle modifications are recommended for individuals who are prehypertensive.

Racial pride. Racial pride, a prevalent construct among African Americans, includes interest or involvement in traditional racial practices and holding positive racial attitudes. Racial pride has been shown to be associated with some health benefits and practices (Kreuter et al., 2002; Lukwago et al., 2001; Nobles, 1991).

Religiosity. Religiosity is a construct demonstrated to be characteristic of African American populations and associated with health beliefs and practices. It includes elements such as attending religious ceremonies, prayer, spirituality, and beliefs about God as an entity responsible for life happenings (Kreuter et al., 2002; Lukwago et al., 2001; Nobles, 1991).

Sociocultural psychology. Sociocultural psychology is the study of the effects of societal norms and culture on individual behavior. Sociocultural constructs in this study were qualitatively explored in relation to exercise behavior.

Time orientation. Time orientation is a person's tendency to think and act according to consequences that are immediate or distal. Therefore, a person's perception of time can be characterized as being primarily a "future

orientation" or "present orientation." Time orientation has been shown to be associated with health beliefs and practices (Kreuter et al., 2002; Lukwago et al., 2001; White & Parham, 1990).

CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of this study was two-fold. The first purpose was to examine patterns of adherence and to describe the influences of demographic, psychosocial, physiological, and sociocultural variables on adherence among African Americans enrolled in the Fit 4 Life study. The second purpose was to determine follow-up exercise behaviors of participants previously enrolled in the Fit 4 Life study. This chapter is designed to explore past research related to hypertension and exercise, and factors influencing exercise adherence among African Americans. This review of the literature is presented in the following sections: (a) hypertension and African Americans, (b) hypertension and exercise, (c) determinants of exercise adherence, (d) culture and health behaviors, (e) African Americans' exercise behavior, and (f) the biopsychosocial model of health and illness.

Hypertension and African Americans

Hypertension, also known as high blood pressure, is a major public health challenge in the United States, affecting more than 76 million Americans (AHA, 2012). According to the Centers for Disease Control and Prevention

(2011), nearly 1 out of 3 adults has high blood pressure, and the disease cost the United States approximately \$76.6 billion dollars in health care services, medications, and work absenteeism in 2010 (CDC, 2011; Lloyd-Jones et al, 2010). Hypertension, which is characterized by an increased amount of force exerted on the arteries during blood circulation, is a risk factor for cardiovascular disease (e.g., myocardial infarction, stroke, and heart failure), renal failure, and mortality. The disease is often asymptomatic, which is why the disease is commonly referred to as "the silent killer" (Ong et al., 2007).

There are numerous risk factors for the development of hypertension, which include: (1) age, (2) ethnicity, (3) family history and genetic factors, (4) overweight and obesity, (5) insulin resistance, (6) sedentary lifestyle, (7) stress and psychosocial factors, (8) low education and socioeconomic status, (9) smoking, and (10) dietary factors (e.g., high sodium intake, low dietary calcium, low dietary potassium, and excessive alcohol intake) (AHA, 2012; Carretero & Oparil, 2000; Lloyd-Jones et al., 2010).

The Seventh Report of the National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC7, 2004) provides updated guidelines regarding hypertension and its management, and is informed

by research published from 1997-2003. According to the JNC7 (2004), there are four classifications of blood pressure: normal, prehypertension, Stage 1 hypertension, and Stage 2 hypertension. (Table 1 illustrates the classifications of blood pressure for adults.)

Table 1

Blood Pressure Classifications for Adults

Blood pressure classification	SBP (mmHg)	DBP (mmHg)
Normal	<120	and <80
Prehypertension	120-139	or 80-89
Stage 1 hypertension	140-159	or 90-99
Stage 2 hypertension	≥160	or ≥100

Note. SBP = systolic blood pressure; DBP = diastolic blood pressure. Adapted from The Seventh Report of the National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure, 2004.

Prehypertension blood pressure classification is not a disease classification; however, it implies that individuals should implement lifestyle modifications (i.e., weight reduction, moderate alcohol consumption, low-fat/low-sodium diet, physical activity) in order to reduce their future risk of developing hypertension (JNC7, 2004).

Studies of hypertension epidemiology have used data from the National Health and Nutrition Examination Survey (NHANES) data (Hertz et al., 2005; Wang & Wang, 2004). According Wang and Wang (2004), approximately 60% of

Americans have prehypertension or hypertension, and only 31% of individuals with hypertension have their condition controlled. Further, less than two-thirds of the hypertensive patients in the study had adopted lifestyle changes or taken medications to reduce their blood pressure (Wang & Wang, 2004).

The racial and ethnic disparities regarding hypertension, its development, and treatment have been well documented (AHA, 2012; CDC, 2011; Hertz et al., 2005; Lloyd-Jones, 2010; Wang & Wang, 2004). According to the American Heart Association (2012), more than 40% of African Americans have high blood pressure. More specifically, the National Center for Health Statistics (2008) reports that 42.2% of African American men and 44.1% of African American women have high blood pressure. This is greater than their Caucasian counterparts (31.2% and 28.3%, respectively), and well above the national average of 31.3% (NCHS, 2008).

In an analysis of NHANES 1999-2002 data, Hertz and colleagues (2005) found that African Americans are more likely to have hypertension, more likely to be aware of their hypertension, and more likely to be pharmacologically treated than Caucasians; however, African Americans are less likely to have controlled blood pressure levels compared to Caucasians.

Warren-Findlow, Seymour, and Brunner Huber (2012) examined the association between self-efficacy to manage hypertension and adherence to the six self-care behaviors recommended by the JNC7 (i.e., eating a low sodium diet, achieving a healthy weight, engaging in regular physical activity, limiting alcohol consumption, eliminating tobacco use, and adhering to hypertensive medication regimens) among African American adults with hypertension. Participants responded to prompts assessing their level of self-efficacy for self-care behaviors, as well as frequency of practicing each self-care behavior, using a rating scale format. Results indicated that self-efficacy to manage hypertension was associated with higher prevalence of adherence to all of the self-care behaviors, except for limited alcohol consumption. Researchers also noted that over 80% of study participants were overweight or obese; however, less than one-third were practicing strategies to maintain or lose weight (e.g., decreasing portion sizes and exercising to lose weight) (Warren-Findlow et al., 2012).

Hypertension and Exercise

While hypertension is a chronic illness influenced by a number of modifiable and non-modifiable risk factors, researchers and practitioners agree that the adoption of a healthy lifestyle (i.e., eating a healthy/low sodium diet,

achieving a healthy weight, engaging in regular physical activity, and limiting alcohol consumption) is essential for the prevention of hypertension and is a vital component of its management (JNC7, 2004). Lifestyle modifications have been proven to reduce blood pressure, decrease cardiovascular disease risk, and enhance the effectiveness of antihypertensive medications (JNC7, 2004). Implementing more than one lifestyle modification (e.g., reducing dietary sodium and engaging in physical activity) can elicit even greater benefits.

Regular physical activity has emerged as a nonpharmacological treatment for hypertension, as well as many other chronic diseases such as cardiovascular disease, Type II diabetes, obesity, osteoporosis, depression, and colon and breast cancers (ACSM, 2009; Blair, Cheng, & Holder, 2001; De Moor, Beem, Stubbe, Boomsma, & De Geus, 2006; Paluska & Schwenk, 2000; Warburton, Nicol, & Bredin, 2006), and reducing overall mortality rates (CDC, 1999). Regular physical activity also reduces anxiety, improves cognitive function, increases self-esteem, and enhances health-related quality of life (Colcombe & Kramer, 2003; Courneya et al., 2003; Fox, 2000; Lautenschlager et al., 2008).

The American College of Sports Medicine (Haskell et al., 2007) recommends that healthy adults between the ages of 18 and 65 years old engage in moderate-intensity aerobic physical activity for a minimum of 30 minutes on five days each week, or vigorous-intensity aerobic activity for a minimum of 20 minutes on three days each week. Individuals may accumulate these recommended goals through shorter bouts of activity lasting 10 minutes or more. This recommendation is in addition to activities of daily living, such as casual walking, cooking, or shopping, or activities lasting less than 10 minutes in duration (e.g., walking from the parking lot)(Haskell et al., 2007). This physical activity recommendation also includes muscle-strengthening activities, consisting of 8-10 exercises performed on two or more nonconsecutive days each week. Eight to 12 repetitions of each exercise should be performed, leading to volitional fatigue (Haskell et al., 2007). The U.S. Department of Health and Human Services (2008) presents similar recommendations stating that healthy adults should accumulate at least 150 minutes of moderate-intensity aerobic physical activity, or a minimum of 75 minutes of vigorous activity, each week.

In addition to the physical activity recommendations established for healthy adults, researchers and clinicians

have established exercise guidelines for individuals with hypertension and other chronic diseases. Several systematic reviews on the role of exercise specifically on hypertension treatment and prevention have been published (Hagberg, Park, & Brown, 2000; Kokkinos & Papademetriou, 2000; Wallace, 2003) and present these recommendations.

According to Hagberg et al. (2000), regular mild to moderate intensity aerobic exercise decreases blood pressure in approximately 75% of individuals with hypertension, and also provides protective effects for normotensive individuals (Hagberg et al., 2000; Wallace, 2003). The current exercise prescription for the treatment of hypertension is 20-60 minutes, 3-5 days per week, at 40-70% of an individual's maximal oxygen consumption ($VO_2 \text{ max}$) (Wallace, 2003). The mode of exercise should be aerobic in nature.

As previously stated, aerobic exercise training is effective for approximately 75% of individuals with hypertension (Hagberg et al., 2000), eliciting an average of 11 mm Hg and 8 mm Hg reductions in systolic and diastolic blood pressures, respectively (Hagberg et al., 2000; Wallace, 2003). Researchers purport that exercising at higher intensities (i.e., $\geq 70\% VO_2 \text{ max}$) elicits no greater effect than exercising at low to moderate

intensities (i.e., $\leq 70\% \text{VO}_2 \text{ max}$), and even may not be as effective in lowering blood pressure than lower intensities. Research demonstrates that systolic and diastolic blood pressures may significantly decrease in as little as 1 to 10 weeks of aerobic exercise training, and systolic may continue to decrease up to 20 weeks of training (Hagberg et al., 2000). Furthermore, these changes in blood pressure are independent of body fat or weight reduction (Hagberg et al., 2000; Wallace, 2003).

More research in the area of exercise and hypertension treatment is needed, particularly among African Americans, who disproportionately suffer from the disease. Previous research suggests that ethnicity moderates the relationship between exercise and blood pressure reduction (Hagberg et al., 2000; Wallace, 2003).

While researchers are systematically implementing aerobic exercise interventions in order to examine the effects of exercise on hypertension, the efficacy of these interventions cannot be fully evaluated unless participants adhere to the treatment (i.e., exercise) (Marcus et al., 2000; Woodard & Berry, 2001).

Determinants of Exercise Adherence

Determinants are factors which indicate a reliable or predictive relationship between that particular influence

and adherence, without implying causation (Dishman, Sallis, & Orenstein, 1985). Identifying determinants of exercise adherence is valuable because it acknowledges the wide range of factors that may influence an individual's exercise and physical activity behavior, and may help specify which segments of the population may need to be targeted in research interventions (Dishman et al., 1985).

Researchers have established numerous determinants of adherence to exercise (Dishman, 1982; Dishman et al., 1985; Rhodes et al., 1999; Trost et al., 2002). Determinants of exercise adherence are typically divided into six categories: (a) demographic and biological (e.g., age, gender, and BMI), (b) psychological, cognitive, and emotional (e.g., barriers, exercise self-efficacy, and knowledge), (c) behavioral attributes and skills (e.g., smoking, past exercise behavior, and dietary habits), (d) social and cultural (e.g., peer and family support, and group cohesion), (e) physical environmental (e.g., access to facilities, and traffic), and (f) physical activity characteristics (e.g., intensity, duration, and perceived effort) (Trost et al., 2002). Age and gender are demographic/biological variables that have been consistently correlated to physical activity. Men are typically more physically active than women, and level of

activity and age are inversely related (Troost et al., 2002; Weinberg & Gould, 2010). Relationships between physical activity and demographic/biological variables such as race/ethnicity, body mass index, and education have also been established. Research consistently shows that exercise self-efficacy is the strongest determinant of exercise behavior (Troost et al., 2002). It is important to note that determinants are not isolated variables; rather, they influence and are influenced by other determinants (Dishman et al., 1985).

Determinants of exercise adherence are categorized as being positive, negative, or neutral. A positive determinant indicates that there is a positive correlation between that factor and adherence. For example, access to facilities is a positive determinant, meaning that accessibility and adherence are positively correlated. A negative determinant indicates that an inverse relationship exists between that factor and adherence. For example, age is a negative determinant, indicating that advanced age and exercise adherence are inversely related. Neutral determinants, such as cost and physician influence, indicate that research shows no relationship (positive or negative) among that factor and adherence to exercise. See Table 2 for a list of determinants of exercise adherence.

Adherence to exercise is poor among general and clinical populations. Researchers have found that approximately 50-65% of people beginning an exercise program will drop out within 3 to 6 months (Annesi & Unruh, 2007; Buckworth & Dishman, 2002; Courneya, Estabrooks, & Nigg, 1997; Dishman & Buckworth, 1996). Adherence to exercise programs is influenced by perceived barriers and benefits to participation (Sechrist, Walker, & Pender, 1987) and these constructs are integral to various models of behavior change in a physical activity context, such as the transtheoretical model (Prochaska & Velicer, 1997), and social cognitive theory (Bandura, 1986). Lack of time and inaccessibility are the most commonly cited barriers to not initiating and adhering to exercise programs (Dishman, 2001), whereas improvements in health and fitness are commonly cited benefits to participation (Sechrist et al., 1987).

Given the numerous determinants of exercise behavior, health and exercise psychologists have developed theories in order to account for the various influences on behavior. These theories have established the frameworks through which adherence interventions have been implemented.

Table 2

Determinants of Exercise Adherence

Determinant	Positive	Negative	Neutral
DEMOGRAPHIC/BIOLOGICAL			
Age		X	
Gender (male)		X	
Overweight		X	
Level of education	X		
High risk for heart disease		X	
Socioeconomic status	X		
Blue-collar occupation		X	
PSYCHOLOGICAL/COGNITIVE/EMOTIONAL			
Attitudes			X
Barriers to exercise		X	
Enjoyment of exercise	X		
Expectation of health benefits	X		
Intention to exercise	X		
Knowledge of health and exercise			X
Lack of time		X	
Mood disturbance		X	
Perceived health or fitness	X		
Exercise self-efficacy	X		
Self-motivation	X		
BEHAVIORAL ATTRIBUTES AND SKILLS			
Diet			X
Past childhood unstructured PA			X
Past adulthood unstructured PA	X		
Past program participation	X		
School sport			X
Smoking		X	
Type A behavior pattern		X	
SOCIAL AND CULTURAL			
Class size			X
Group cohesion	X		
Physician influence			X
Past family influence	X		
Social support friends/peers	X		
Social support spouse/family	X		
Social support staff/instructor	X		
PHYSICAL ENVIRONMENT			
Climate/season		X	
Cost			X
Disruptions in routine		X	
Access to facilities: actual	X		
Access to facilities: perceived	X		
Home equipment			X
PHYSICAL ACTIVITY CHARACTERISTICS			
Intensity		X	
Perceived effort		X	
Group program	X		
Leader qualities	X		

Note. Adapted from R. Weinberg and D. Gould, 2010, *Foundations of Sport and Exercise Psychology*, Champaign, IL: Human Kinetics, p. 428. Originally adapted from R. Weinberg and D. Gould, 1999, *Foundations of Sport and Exercise Psychology*, Champaign, IL: Human Kinetics, p. 380.

One of the most commonly used theoretical frameworks to explain behavior is social cognitive theory (Bandura, 1986). Social cognitive theory posits that behavior change is influenced by interactions between personal (e.g., emotions, cognitions, physiology), environmental (e.g., social norms, community), and behavioral factors (e.g., required skill level, intensity) (Bandura, 1986). Each of these entities may affect or be affected by the other two, a process known as reciprocal determinism. A critical element in social cognitive theory is self-efficacy, an individual's confidence in one's abilities to perform a particular behavior or specific task (Bandura, 1977, 1986), and is derived from mastery experience, vicarious experience, verbal persuasion, and physiological/affective states. Self-efficacy is one of the most powerful predictors of adherence to exercise (Troost et al., 2002).

Self-efficacy is a central element of the transtheoretical model (TTM) of health behavior change, as well (Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997). The transtheoretical model is a stage model, in which behavior change is conceptualized as a

dynamic, nonlinear process. Individuals progress through a series of six stages: (1) precontemplation, (2) contemplation, (3) preparation, (4) action, (5) maintenance, and (6) termination (Prochaska & DiClemente, 1983; Prochaska & Marcus, 1994). Individuals are assigned to one of the stages based upon their physical activity behavior and related cognitions, and progression through the stages involves the utilization of experiential and behavioral processes (Prochaska & Velicer, 1997).

Individuals in the precontemplation stage are not intending to exercise in the foreseeable future (i.e., typically the next six months). Individuals in the second stage, contemplation, are intending to change their behavior in the next six months. Individuals in the preparation stage are intending to take action within the next month, and those in the action stage have implemented their behavior change in the past six months. The fifth stage, maintenance, is the phase in which individuals have been sustaining their behavior for more than six months. The final stage, termination, is the stage in which individuals have no temptation to return to their former behavior, and total self-efficacy in their ability to maintain their behavior (Prochaska & Velicer, 1997).

Constructs from the transtheoretical model are often used in research to examine exercise behavior, as well as implement interventions. Williams et al. (2008) compared psychosocial predictors of physical activity adoption and maintenance among healthy, previously sedentary adults ($N = 205$) enrolled in a 12-month at-home intervention. Psychosocial predictors (i.e., self-efficacy, decisional balance, processes of change, outcome expectations, enjoyment, satisfaction, social support, and environmental access) were assessed at baseline, six and 12 months. Researchers evaluated psychosocial variables among participants who were active at six months ($n = 98$) and those who were inactive at six months ($n = 107$). Active participants scored significantly higher than non-active participants on 9 out of 12 psychosocial variables, including self-efficacy, decisional balance, and behavioral processes (Williams et al., 2008).

Wallace and colleagues (2000) examined various transtheoretical and social cognitive constructs associated with exercise behavior and intention among 937 college students (Wallace, Buckworth, Kirby, & Sherman, 2000). Researchers mailed packets containing questionnaires addressing stage of change (SOC), personal, behavioral, and environmental variables which were hypothesized to

influence exercise behavior. Exercise self-efficacy was a strong predictor of exercise stage among male and female college students. Family social support was a strong predictor for females, and friend social support was a strong predictor for males (Wallace et al., 2000).

The stage of change (SOC) construct from the transtheoretical model is often used in research to determine physical activity behavior, as well as implement physical activity interventions. This construct has not only be quantitatively measured, but also been explored in qualitative studies investigating exercise behavior. In order to explore factors influencing exercise behavior among 103 African American men and women ages 55 and older, Walcott-McQuigg and Prohaska (2001) assessed stage of change in order to form focus groups. This classification allowed researchers to evaluate similarities and differences among groups based upon their level of motivational readiness (Walcott-McQuigg & Prohaska, 2001). Focus group participants were assigned to either a precontemplation group, a contemplation/preparation group, or an action/maintenance group. The study uncovered several differences about perceptions of exercise among the groups. Precontemplators viewed exercise as a strenuous activity, compared to individuals in the action/maintenance

group, who defined exercise in broader terms. Also, precontemplators and contemplators/preparers discussed exercise benefits in terms of disease prevention; whereas, members of the action/maintenance focus group acknowledged a variety of physical and mental health benefits (Walcott-McQuigg & Prohaska, 2001).

Culture and Health Behaviors

Environmental influences on health behaviors comprise elements of several models (e.g., social cognitive, transtheoretical, social ecological). One of the environmental influences worthy of further exploration in the exercise psychology literature is cultural influence. A significant amount of literature asserts that the implementation of culturally-tailored interventions is needed to address health disparities among certain ethnic and cultural groups (Harvey & Afful, 2011; Kennedy et al., 2007; Kreuter et al., 2003; Resnicow, Baranowski, Ahluwalia, & Braithwaite, 1999). Researchers claim that health disparities among certain groups can be achieved through addressing four cultural characteristics among African Americans which have an established relationship to health behaviors and decision-making: collectivism, racial pride, religiosity, and time orientation (Kreuter et al., 2003).

Researchers have explored the effects of various cultural constructs on health behaviors, both quantitatively and qualitatively (Harvey & Afful, 2011; Kennedy et al., 2007; Lwago et al., 2001; Nobles, 1991; White & Parham, 1990). Harvey and Afful (2011) examined the relationship between racial identity and health behaviors in a sample of 86 Black Americans. Participants completed questionnaires of nationalist identity (i.e., the importance and uniqueness of being Black), racial typicality (i.e., the tendency to view a behavior as being more typical of one race compared to another), activity importance, and engagement in health behaviors. Results indicated that higher Black racial typicality scores predicted greater importance and engagement ratings of health-promoting behaviors; meaning, participants valued and participated in activities that were seen as being "typically Black" more than those believed to be "typically White." Researchers contend that an individual's beliefs about his or her racial group serve as a guide for making decisions. Further, racial identity "provides paramount importance for how Black Americans perceive and understand the world" (Harvey & Afful, 2011, p.178).

Kennedy et al. (2007) conducted five focus groups with 31 African American men and women. Several cultural themes

related to the aforementioned characteristics (i.e., collectivism, racial pride, religiosity, and time orientation) emerged. One of these themes was "religion is a powerful force" (Kennedy et al., 2007, p. 550). Some participants expressed a belief in God's ability to heal in the absence of health care or health-promoting behavior (Kennedy et al., 2007), which presents a unique challenge for individuals promoting these behaviors. Other themes that emerged were extended family structure and limited resources (Kennedy et al., 2007).

African Americans' Exercise Behavior

Several studies have explored cultural and other influences specifically on African Americans' exercise behavior (Banks-Wallace, 2001; Harley et al., 2009; Quinn & Guion, 2010). Newton and Perri (2004) conducted a randomized pilot study examining strategies for home-based exercise promotion among African Americans. Participants (N = 60) ages 30-69 were randomized into one of three conditions: standard behavioral exercise counseling, culturally-sensitive exercise counseling, or physician advice group. In addition to cardiorespiratory and adherence data measures, acculturation, self-efficacy, social support, and program satisfaction were also assessed (Newton & Perri, 2004).

Researchers found that while participants in all three groups reported increases in self-reported physical activity, only participants in the standard exercise counseling and culturally-sensitive exercise counseling groups experienced increases in cardiorespiratory fitness (Newton & Perri, 2004). Furthermore, participants in the culturally-sensitive exercise counseling group reported greater program satisfaction and greater social support, than participants in the other two groups. There was no statistically significant difference in adherence rates for the three groups (Newton & Perri, 2004).

Other studies have implemented culturally-relevant interventions in order to assess psychosocial correlates of adherence. Izquierdo-Porrera, Powell, Reiner, and Fontaine (2002) assessed social support, health-related quality of life, depression, exercise motivation, and self-efficacy among 48 African American men and women (age 57 ± 14 years). Participants engaged in an African American church-based exercise program lasting one hour, three days a week, consisting of low-impact aerobics and strength-training. The program lasted for six months. The average adherence rate for study participants was 27%, which is similar to previous studies of this length in the African American community (Izquierdo-Porrera et al., 2002).

While numerous studies have explored African Americans' exercise behavior, several studies have compared exercise behavior among both Caucasians and African Americans. Wexler et al. (2008) examined stage of change for diet and exercise among African American and Caucasian hypertensive men and women ($N = 244$). Participants responded to the following question: Have you changed your diet (reduced sodium, decreased alcohol, lowered fat) or exercise habits to help lower your blood pressure? Participants completed the survey by indicating which of five possible responses was true for them (ranging from 1 = no, and I do *not* intend to in the next 6 months, to 5 = yes, I have been for *more* than 6 months), and were then asked which lifestyle choice they preferred: exercise, weight loss, reduced salt, increased fruits and vegetables, or moderation of alcohol. Results from the study revealed that African American participants were three times more likely than Caucasians to be in the preparation stage over the action stage for exercise, meaning that African Americans were more likely to be thinking about exercise rather than actively exercising (36% and 17%, respectively). Results also showed that both Caucasians and African Americans preferred exercise and increased fruit/vegetable consumption over salt reduction, weight

loss, and moderate alcohol consumption for controlling their blood pressure. Caucasians and African Americans in this study had similar levels of education (30% were high school graduates); however, African Americans had significantly lower incomes, suggesting that there may be a positive relationship between income and level of physical activity.

Similarly, Wilbur, Miller, Chandler, and McDevitt (2003) compared determinants of physical activity and adherence among 153 African American ($n = 50$) and Caucasian ($n = 103$) women enrolled in a 24-week at-home walking program. Researchers examined past exercise participation, social role influence, exercise self-efficacy, and self-determinism among participants. Adherence to exercise was measured using data uploaded from heart rate monitors worn by each participant. Results showed that exercise adherence was significantly higher for Caucasian women compared to African American women (71.5 ± 24.6 and 56 ± 28.3 , respectively); however, African Americans had significantly higher exercise self-efficacy scores than Caucasian women, ($M = 75.80 \pm 15.91$ and $M = 69.07 \pm 17.31$, respectively). Self-determinism scores did not vary significantly by ethnic group. Results also showed that marital status and number of children had no significant

influence on exercise self-efficacy, self-determinism, or adherence.

In a systematic review of 29 qualitative studies, Siddiqi, Tiro, and Shuval (2011) explored barriers and facilitators to physical activity among African Americans. For African American men and women aged 18-50, the most commonly cited barriers to physical activity were lack of time, lack of motivation, and lack of knowledge. Hair maintenance was a barrier for African American women. The most commonly cited social and environmental barriers were lack of childcare, family responsibilities, cost, long working hours, and hard manual labor jobs (Siddiqi et al., 2011).

African American men and women older than 50 years old cited physical concerns (e.g., heart disease, musculoskeletal disorders) as individual barriers to being physically active. Others were fatigue and lack of knowledge (Siddiqi et al., 2011). Commonly cited social and environmental barriers to physical activity among this group were cost, unsafe neighborhoods, lack of facilities, and lack of transportation (Siddiqi et al., 2011).

The most commonly cited individual facilitators among both age groups were positive health benefits, mental health/stress relief, and a sense of well-being. The most

commonly cited social and environmental facilitators were social support and structured/group exercise (Siddiqi et al., 2011).

The majority of research on social context factors influencing African American physical activity participation has focused on women; however, in a recent study, Griffith, Gunter, and Allen (2011) examined barriers to African American men's physical activity participation. Researchers conducted 14 focus groups with 105 middle-aged African American men, which yielded themes related to gender role strain as a barrier to participation. Specific themes were time commitments and priorities of roles and responsibilities, social and cultural norms about work and physical activity, and the stress and exhaustion to trying to be the provider of the family (Griffith et al., 2011). Researchers concluded that African American men did not place a high priority on physical activity because it is not socially and culturally attuned to their life role, and they perceive that their friends, family, and communities reinforce those views (Griffith et al., 2011).

Research related to physical activity participation has explored a number of physiological, psychosocial, and environmental factors; however, few have attempted to do so

comprehensively, particularly in regard to African Americans.

The Biopsychosocial Model

In 1977, Engel introduced a novel framework for understanding the determinants of disease. Engel (1977) argued that biological factors do not account for all health outcomes, and the dominant biomedical model of disease did not allow for understanding the influence of social, psychological, and behavioral dimensions on illness. Engel purported that a significant limitation of the biomedical model was that it did not "include the patient and his attributes as a person, a human being" (Engel, 1980, p. 536).

Furthermore, Engel (1977, 1980) argued that in order to fully understand the etiologies of and to provide ample treatment for various illnesses, researchers and physicians must consider the interactions which occur between the various dimensions (i.e., physiological, psychological, social, behavioral). Engel (1980) expounded upon his biopsychosocial model of disease, which is based upon general systems theory and social ecological theories, and explained that it is best understood by conceptualizing it as a "hierarchically arranged continuum" of systems. Each

system possesses its own unique characteristics and methods of inquiry. Figure 1 illustrates the biopsychosocial model.

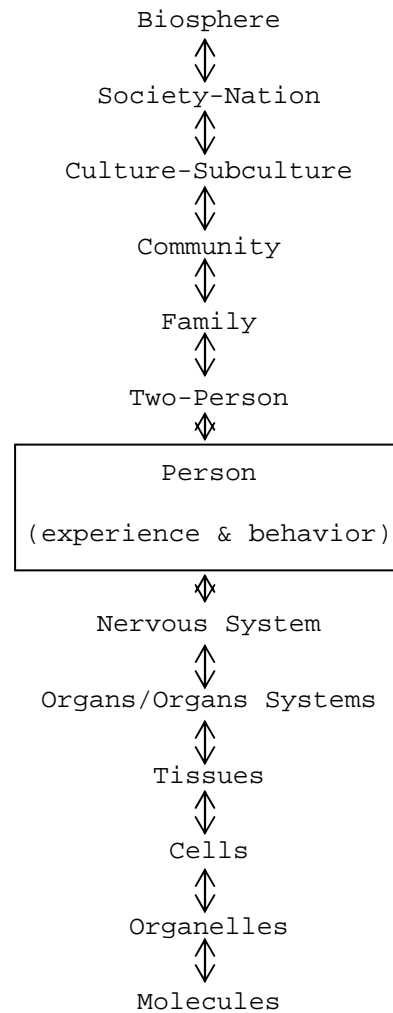


Figure 1. Hierarchical continuum illustration of the biopsychosocial model. Adapted from Engel, 1980.

The biopsychosocial model is grounded in the concept that a reciprocal relationship exists between each system. That is, each system influences and is influenced by the others (denoted by the arrows). Furthermore, each system is a component of the higher systems (Engel, 1980). For

example, *cells* are a component of the *tissues* and *organs* systems, and *family* is a component of *community* and *culture*. Each system is influenced by its environment (or larger systems). Finally, while the biopsychosocial model is a hierarchical continuum, it consists of two smaller hierarchies: organismic and social. The individual (person) represents the highest level of the organismic hierarchy, as well as the lowest level of the social hierarchy (Engel, 1980).

The investigation of psychosocial and behavioral influences on disease and health is vital. Engel's (1977; 1980) model has been further elaborated upon by interdisciplinary researchers (Brown et al., 2012; Lindau, Laumann, Levinson, & Waite, 2003; Wetter et al., 2001).

Wetter and colleagues (2001) present a noteworthy adaption of Engel's biopsychosocial model, in their framework which conceptualizes determinants of individual human behavior (i.e., eating and physical activity) as a kaleidoscope. In this model, there are five levels: the psychobiologic core, culture, social, enablers of choice, and behavioral skills. (See Figure 2.)

The psychobiologic core consists of characteristics of the individual, such as genetics, physiological factors, and self-identity. The cultural level consists of

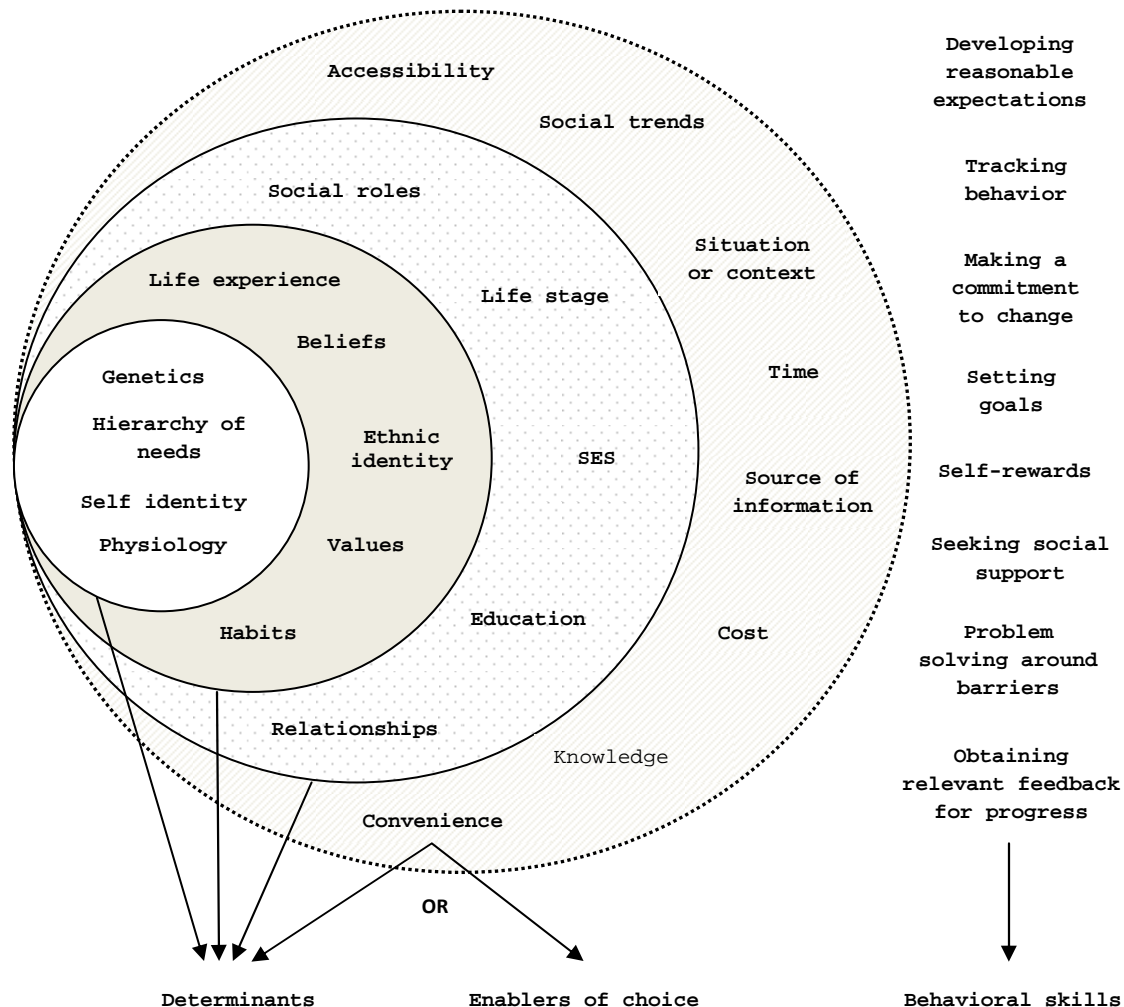


Figure 2. Kaleidoscope framework of determinants of physical activity at the level of the individual, and intervention strategies. Adapted from Wetter et al., 2001.

determinants which are highly influenced by external factors, such as values, beliefs, ethnic identity, and life experiences. Similarly, social determinants are highly influenced by external factors and consist of characteristics such as interpersonal relationships, social roles, socioeconomic status, and education. The next level, enablers of choice, consists of the characteristics

of the actual environment in which the lifestyle behavior occurs, such as social trends, social and physical context, cost, time, and knowledge. The final outer layer is behavioral skills, and represents the actual processes which facilitate the behavior (Wetter et al., 2001).

Several studies have explored the interaction of biopsychosocial influences on health and disease, and this inquiry is emerging in exercise adherence research, as well. Near the beginning of this movement, Dishman and Gettman (1980) investigated psychological and physiological factors among male adherers and dropouts ($N = 66$) enrolled in a 20-week supervised cardiovascular or muscular endurance training program. Cohorts consisted of healthy subjects ($n = 45$) and participants with coronary heart disease ($n = 21$). Participants completed inventories of self-motivation, attraction to physical activity, health locus of control, and perceived values of physical activity. Physiological variables such as body weight, body composition, and maximal oxygen consumption, were also measured. Exercise adherence data were determined using daily exercise logs, and the data were used to categorize participants as adherers (i.e., were involved all 20 weeks of the program) or non-adherers (i.e., discontinued participation prior to the end of the 20 weeks).

Percent body fat, body weight, and self-motivation were the most significant predictors of adherence. Based upon these variables, 78.79% of all participants were correctly categorized (i.e., adherer or non-adherer). Also, participants without a diagnosis of heart disease adhered significantly longer ($M = 48.3$ days) than participants with established heart disease ($M = 35.1$ days). Dishman and Gettman (1980) concluded that adherers had less body fat, weighed less, and were more self-motivated than non-adherers.

In a more recent study, Irwin and colleagues (2004) examined demographic, physiologic, and psychosocial variables on adherence to a year-long aerobic exercise intervention, among post-menopausal women randomized into the exercise group. Participants ($N = 87$) were women aged 50 - 75 years old, were sedentary, had a $VO_2 \text{ max} < 25.0$ ml/kg per min, and a body mass index > 25.0 kg/m². The exercise intervention consisted of a combination of supervised and at-home sessions (a total of 5 days/week). Adherence was measured through daily exercise logs. Most participants ($n = 45$, 52%) adhered to at least 80% of the exercise sessions, and 8% of the participants ($n = 6$) dropped out and did so in the first three months of the program.

Participants who participated in sports/recreational activities in the three months preceding the study exercised significantly more minutes than those who did not (190 ± 18 and 164 ± 11 min, respectively), and participants with a higher $VO_{2 \max}$ exercised more minutes (195 ± 15 min) than those with a lower $VO_{2 \max}$ (134 ± 16 min).

Statistically significant relationships existed between high levels of adherence and several additional variables, including non-Hispanic White women, not working full-time, greater participation in supervised exercise sessions, and greater participation in group education classes (on exercise behavior change).

Summary

Exercise adherence is a complex phenomenon, and involves interactions among the individual, the environment, and the community (Martin et al., 2000; Mihalko et al., 2004); therefore, researchers should adopt a biopsychosocial perspective to study the interaction of physiological, psychological, and social variables in adherence research (Martin et al., 2000).

More exercise adherence research should be conducted with African Americans because of this population's disproportionate rate of chronic disease, and the efficacy of exercise in the prevention and treatment of these

diseases, particularly hypertension. This study is informed by the biopsychosocial model, thereby acknowledging that social determinants of physical activity occur in a biocultural context (Dishman, 2001), and aims to contribute to the literature because it provides a comprehensive approach to examining factors influencing factors among this population.

CHAPTER 3

METHODOLOGY

The purpose of this study was two-fold. The first purpose was to examine patterns of adherence and to describe the influences of demographic, psychosocial, physiological, and sociocultural variables on adherence among African Americans enrolled in the Fit 4 Life study. The second purpose was to determine follow-up exercise behaviors of participants previously enrolled in the Fit 4 Life study. This chapter is comprised of the following sections: (a) research design, (b) participants, (c) procedures, (d) instrumentation, and (e) data analysis.

Research Design

This study employed a mixed method parallel design (Hesse-Biber, 2010; Teddlie & Tashakkori, 2009), consisting of a qualitatively-driven core component and a quantitative supplementary component. The qualitative data provide an in-depth understanding of participants' experiences of adopting and maintaining regular exercise, as well as provide insight into how various factors (i.e., demographic, psychosocial, physiological, and, sociocultural) may influence their experiences and ultimately, their adherence to exercise. The inclusion of

quantitative measures on physiological and psychosocial constructs was important in order to describe the study population and understand the relationship of these factors to exercise adherence among the participants.

According to Teddlie and Tashakkori (2009), mixed method research is stronger than single approach research designs in three particular aspects. First, mixed method research can simultaneously address a range of confirmatory and exploratory questions; therefore, the researcher is able to generate and verify theory in the same study. This is due to the different types of questions answered by each (i.e., qualitative vs. quantitative) approach. Qualitative questions are intended to generate new information about unknown aspects of a phenomenon and answered using inductive logic (i.e., exploratory); whereas quantitative questions are focused on testing conjectures and answered using deductive logic (i.e., confirmatory) (Teddlie & Tashakkori, 2009).

Second, mixed method research allows the researcher to create stronger, more accurate inferences (Teddlie & Tashakkori, 2009). This is possible because mixed method research allows for triangulation of data, as well as the complementarity of the research design. Triangulation, or convergence of the results from different methods, enhances

credibility of findings (Greene, 2007; Hesse-Biber, 2010); whereas complementarity refers to the purpose of mixed methods being to provide results from different methods that "serve to elaborate, enhance, deepen, and broaden the overall interpretations and inferences from the study" (Greene, 2007, p. 101).

Finally, mixed method research provides the opportunity for a greater range of divergent findings (Teddlie & Tashakkori, 2009). In contrast to the triangulation and complementarity purposes of mixed method research, it can also yield conflicting results, at which time the researcher may infer that different voices and perspectives are reflected in the investigation. Mixed method researchers purport that these diverging perspectives are valuable in that they may raise new questions warranting further investigation, and may ultimately lead to new information learned (Greene, 2007; Hesse-Biber, 2010; Teddlie & Tashakkori, 2009). The aforementioned strengths of mixed method research are particularly useful when investigating complex phenomena such as adherence to exercise and exercise behavior.

Participants

Participants in this study ($N = 75$) were currently enrolled or previously enrolled participants in the Fit 4

Life study. The Fit 4 Life study is a research study conducted by the Hypertension, Molecular, and Applied Physiology (HyMAP) Lab in Temple University's Department of Kinesiology. The study examines the role of genetics and aerobic exercise in blood pressure and endothelial function. After obtaining approval of the Institutional Review Board at Temple University, the researchers began the process of obtaining the desired sample. (See Appendix A for the consent form.)

Eligible participants were African American men or women ages 40-75, who were sedentary (engaged in regular aerobic exercise ≤ 2 sessions/wk and < 20 min/session, sedentary occupation), were nonsmoking for at least a year, and were also non-diabetic (fasting glucose level < 126 mg/dl). In order to be eligible, participants also had to have an average systolic BP from two screening visits of 120-159 or diastolic BP of 80-99 mm Hg (JNC7 Prehypertension and Stage 1 Hypertension) while not on antihypertension medication. Participants who are using no more than one hypertension medication obtained consent from their personal physician to taper and withdraw the medication. Eligible participants also had BMIs < 40 kg/m², consumed less than three alcohol containing drinks per day, and had serum creatinine concentrations < 1.5 mg/dl.

Further, participants had to have a negative echocardiogram exercise test and no CV signs or symptoms during this test. Participants' total cholesterol levels had to be less than 240 mg/dl without the use of any cholesterol medication, and they had no evidence/history of myocardial infarction, malignancies, HIV infection, or other cardiovascular events. Finally, participants had to be free from any medical or orthopedic problems that could impede or be exacerbated by engaging in aerobic exercise training. Participants received \$150 each if they completed the entire study (\$75 at the completion of baseline testing and an additional \$75 at the completion of final testing).

Participants in the Fit 4 Life study were recruited through local newspaper advertisements in the Germantown Chronicle, the Mt. Airy Times, and the West Philadelphia Newspaper. Participants also learned about the Fit 4 Life study by word of mouth. Quantitative data used in this subset of the Fit 4 Life study were collected from participants who successfully completed baseline testing, and were able to proceed to the exercise intervention component of the study.

Participants for the qualitative portion of the study were recruited from currently or previously enrolled Fit 4 Life participants who completed baseline testing. Only

participants who completed and returned the quantitative data were considered for recruitment into the qualitative portion of the study. Participants were contacted by phone or in person and provided information about the qualitative study (see Appendix B). The researcher attempted to recruit participants from various cohorts for the interviews. Those who expressed interest in participating completed consent forms (see Appendix C) prior to being interviewed.

Interviews were conducted with nine participants. This purposeful sample included five participants who successfully completed the aerobic exercise intervention, and four participants who did not successfully complete the exercise training intervention, thereby resulting in their exclusion from the study. This method of sampling allowed the researcher to examine characteristics that were illustrative of the range of variations present in the population of interest (Seidman, 1998), thereby exploring similarities and differences regarding their experiences with exercise and participation in the study.

Procedures

The Temple University Institutional Review Board approved human subjects and research protocol for the larger study in January 2007. An addendum was submitted

and approved in January 2011 to include the addition of the quantitative psychosocial measures (see related consent form in Appendix A). Finally, a research protocol including the qualitative interview component of this study was submitted and approved in April 2012 (see consent form in Appendix C). After recruitment via neighborhood newspapers and word of mouth, potential participants called the HyMAP Lab and were administered an initial telephone screen. Individuals who met the preliminary inclusion criteria scheduled an appointment for an orientation visit, to provide them with in-depth information about the study. Persons interested in continuing were scheduled for their first screening visit, at which time consent forms and health history questionnaires were completed, as well as the physical activity assessment and the Exercise Stages of Change - Short Form (Lee, Nigg, DiClemente, & Courneya, 2001).

Participants continued in a series of three screening visits to determine whether they met eligibility requirements. These visits included BMI measurements, blood and urine sample collection, a physical examination with a cardiologist, a sub-maximal stress echocardiogram, metabolic testing, and casual blood pressure measurements. Those who were eligible for the study then progressed

through a dietary stabilization period, in which participants met once a week for six consecutive weeks with a dietician to learn how to implement the American Heart Association Step One diet. After dietary stabilization, participants went through a series of three baseline testing visits. The first visit included blood sample collection, body composition analysis, and 24-hour ambulatory blood pressure and urine collection. During the second baseline visit, casual blood pressures (according to JNC7 guidelines) were taken and participants completed a VO₂ sub-maximal treadmill test. The final baseline visit took place at Temple University Hospital and included a vessel dilation test. After all baseline testing was completed, participants began the aerobic exercise portion of the study.

Quantitative psychosocial data were collected from participants at various stages of the study. A packet containing the psychosocial measures was compiled and participants completed the packet during the first baseline visit. Participants were also given the option to complete the packet at home, and return the surveys at their second baseline visit. These measures included the Exercise Benefits/Barriers Scale (Sechrist, Walker, & Pender, 1985), Barriers Self-Efficacy Scale (McAuley, 1992),

Multidimensional Health Locus of Control scale (Wallston, Wallston, & DeVellis, 1978), and the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). All baseline measures were also completed during final testing. Permission was granted by the respective corresponding authors to use the aforementioned instruments.

Participants began the aerobic exercise intervention after completing baseline testing. (A detailed description of the intervention is provided in the following section.) After 12 weeks of the 24 week intervention, participants completed the Exercise Benefits/Barriers Scale (Sechrist et al., 1985), Barriers Self-Efficacy Scale (McAuley, 1992), and the Multidimensional Health Locus of Control scale (Wallston et al., 1978). A midway exercise test was also completed at this time point.

All participants who successfully completed baseline testing, and were permitted to proceed to the exercise intervention component of the study, were mailed packets containing psychosocial measures after their completion of the study. These measures included the Exercise Stages of Change - Short Form (Lee et al., 2001), Exercise Benefits/Barriers Scale (Sechrist et al., 1985), Barriers Self-Efficacy Scale (McAuley, 1992), Multidimensional Health Locus of Control scale (Wallston et al., 1978), and

the Satisfaction with Life Scale (Diener et al., 1985). Participants whose demographic information had not been collected during their enrollment in the study also received the demographic questionnaire. Participants received a \$15 gift card of their choice (i.e., Best Buy, Target, Walmart, Subway) upon the return of the surveys (see Appendix D). Out of the 63 packets that were mailed to participants, 42 were returned.

Exercise Intervention

Participants in this study were expected to engage in supervised aerobic exercise training three days a week, for 24 weeks, at individually prescribed intensities. After completion of a baseline VO_2 sub-maximal treadmill test, a regression analysis of each participant's data calculated his or her individual exercise heart rate. During the duration of the exercise intervention, participants would begin exercising at a heart rate corresponding to 50% of their predicted VO_2 max, then progress to 60%, and eventually 75% of their predicted VO_2 max. Participants began exercising for 20 minutes, and eventually increased to 40 minutes of aerobic exercise training. (See Appendix E for the exercise program.)

Exercise training sessions were held at the Department of Kinesiology Health, Fitness and Wellness Center, and

were supervised by master's and doctoral level students. Participants' blood pressures and resting heart rates were taken at the beginning of every exercise session, and blood pressures and recovery heart rates were taken post-workout. Participants were permitted to use a variety of aerobic exercise machines in the fitness center, such as treadmills, elliptical machines, stairclimbers, upright and recumbent bicycles, and row machines. Finally, participants' heart rates were monitored every 10 minutes of exercise to make sure they were working in their prescribed target heart rate range.

Exercise adherence. Exercise adherence is the central phenomenon that was explored in this research study. Adherence was monitored throughout participation in the aerobic exercise intervention, and final adherence data for each participant were calculated at the completion of his or her aerobic exercise training program.

Adherence defined. Adherence was measured in the following two ways:

- *Progress - progression week/time week.* Participants must have engaged in their individualized aerobic exercise program for six months (24 weeks); therefore, this adherence measure took into account

the physiological adaptations that occur during exercise training as well as detraining effect.

- *Sessions completed.* This method of tracking adherence is based upon the number of sessions the participants attended out of the number of possible sessions, given the duration of time enrolled in the exercise training intervention.

Participants were expected to exercise three days a week, for 24 weeks. If participants attended only one exercise session in a week, they were required to repeat that week during the next week. (Their progression week was lower than their time week.) Similarly, if participants missed a week of training, they repeated the last week they attended. (Their progression week would be lower than their time week.) If participants had poor adherence for a week (i.e., one session) and missed a week on two consecutive weeks, they were required to go back a week. (Their progression was two weeks lower than the time week.) Participants were required to have 65% adherence (progression wk/time wk) for their physiological data to be used for pre/post assessment.

Participants were classified as adherers or non-adherers based upon their level of attendance at exercise training sessions. Adherers were those who completed

exercise training with at least 65% adherence (progression wk/time week). Non-adherers were those who either stopped attending exercise training sessions or were excluded due to irregular attendance, which resulted in their inability to complete the 24 week exercise program within one year. Examples of non-adherers are individuals who never began exercise training after completing baseline testing, participants who often attended only one session per week, or those who were traveling or vacationing for long periods of time.

Interviews

Participants ($N = 9$) were previously enrolled in the study. Also, participants had either previously completed the aerobic exercise intervention ($n = 5$), or had been excluded due to lack of adherence to the intervention ($n = 4$). Interview participants were selected based upon their ability or inability to successfully complete the study. Interviews were conducted after completion or exclusion from the study.

The researcher obtained informed consent forms from all of the participants (see Appendix C). Upon recruitment of the participants, interviews were scheduled at a convenient time and location for both the researcher and participant. The researcher conducted all of the

interviews. The interviews were conducted in private rooms. Prior to the participant's arrival the interviewer recorded brief comments, the participant's Fit 4 Life study identification number, time of the interview, and the location of the interview. Interviews lasted approximately one hour.

Rapport was already established between the researcher and the majority of interview respondents due to her role as a member of the Fit 4 Life study research team; however, rapport needed to be re-established before the interview commenced. In order to create an environment where the participants felt comfortable sharing their experiences and feelings, the interviewer first introduced herself, the purpose of the interview, and explained the procedures to follow. The researcher also explained the use of the digital voice recorder and asked if the participant had any questions. The participant was assured that confidentiality would be maintained and that only the researcher and the research advisor would have access to the interview recording. The researcher also informed the participant that the audio recording would be kept in a password protected file on the researcher's office computer in the HyMAP lab, and would be erased six months after the completion of the study. Finally, the researcher informed

the participants that they did not have to answer any question they were not comfortable answering, and they would be able to terminate the interview at any time without consequence. Each interview was recorded using a digital voice recorder (Olympus VN-7600PC, China). Immediately following each interview, the interviewer set aside time to reflect on the interview, take additional notes regarding non-verbal communication, interview atmosphere, and the behavior of the interviewee. Description of the interview instrument is provided below.

Instrumentation

This study was a mixed-methods study; therefore, both quantitative and qualitative instruments (see Appendices F through K for quantitative instruments; see Appendix L for qualitative interview guide) were used.

Quantitative Measures

Demographic data. Demographic data that were collected for participants included age, gender, ethnicity, level of education, marital status, employment status, occupation, household income, size of household, caregiving responsibility, childhood and youth sport/exercise participation, young adulthood sport/exercise

participation, and adulthood sport/exercise participation.
(See Appendix F for the full measure.)

Exercise Stages of Change - Short Form. The Exercise Stages of Change - Short Form (Norman, Benisovich, Nigg, & Rossi, 1998) was completed. Stage of change is a construct in the transtheoretical model, which purports that behavior change involves movement through a series of distinct stages (Prochaska & DiClemente, 1983; Prochaska & Marcus, 1994). The Exercise Stages of Change - Short Form defined exercise, and then required participants to respond to a prompt asking if they engage in regular exercise. Participants completed the survey by indicating which of five possible responses was true for them. The response categories are (1) "Yes, I have been for more than 6 months" (*maintenance*); (2) "Yes, I have been for less than 6 months" (*action*); (3) "No, but I intend to in the next 30 days" (*preparation*); (4) "No, but I intend to in the next 6 months" (*contemplation*); and (5) "No, and I do not intend to in the next 6 months" (*precontemplation*). Participants completed this measure during the initial screening visit, and at follow up. The Exercise Stages of Change - Short Form has been validated and has excellent specificity and sensitivity (Hellsten et al., 2008; Lee, Nigg, DiClemente,

& Courneya, 2001; Norman, Benisovich, Nigg, & Rossi, 1998).
(See Appendix G for the full measure.)

Exercise Benefits/Barriers Scale (EBBS). Participants completed the Exercise Benefits/Barriers Scale (EBBS) at baseline, midway through the aerobic exercise training intervention, and during final testing. The EBBS is a questionnaire used to assess commonly cited perceived benefits of and barriers to being physically active (Sechrist et al., 1985). The EBBS consists of 43 items answered in a 4-point forced-choice Likert-type format. Responses for the 29-item benefits scale range from 4 (*strongly agree*) to 1 (*strongly disagree*). The 19 barrier scale items are reverse scored. Total scores range from 43 to 172, with higher scores indicating positive perceptions of exercise. The EBBS has been frequently used in exercise interventions with various populations, including African American adults (Jones & Nies, 1996; Williams, Bezner, Chesbro, & Leavitt, 2006). The instrument has good internal consistency ($\alpha = .962$) and high test-retest reliability ($r = .88$) (Sechrist et al., 1985). (See Appendix H for the full measure.)

Barriers Self-Efficacy Scale (BARSE). Participants completed the Barriers Self-Efficacy Scale (BARSE) at baseline, midway through the exercise training

intervention, and during final testing. The BARSE is a 13-item questionnaire designed to assess the degree of confidence participants have in their ability to exercise three times a week, for three months, given certain barriers to participation (McAuley, 1992). Degree of confidence in exercising is assessed using a 100% scale, in 10% increments, ranging from 0% (*no confidence at all*) to 100% (*complete confidence*). Confidence ratings for each item are summed and divided by the total number of items in order to derive the total strength of self-efficacy. The BARSE has been used with various populations (Marquez & McAuley, 2006; McAuley et al., 2011) and demonstrates good internal consistency ($\alpha = 0.88$). (See Appendix I for the full measure.)

Multidimensional Health Locus of Control (MHLC) Scale

- Form C. The Multidimensional Health Locus of Control (MHLC) scale was developed by Wallston and colleagues (1994) to assess whether a person believes his or her health is determined by the actions of individuals or not (i.e., luck, chance, or fate). In addition, the MHLC assesses whether an individual believes the locus of control is internal (i.e., his or her own actions) or external (i.e., depends upon the actions of others). Form C of the MHLC scale is a generic, medical-condition-

specific form of the assessment. The word "health" was substituted for the original word "condition."

Participants responded to each of the 18 items using a 6-point Likert-type format. Scores from each subscale were summed, and all of the subscales are independent of one another. The MHLIC scale demonstrates good construct validity (Wallston, 2005) and is reliable, demonstrating sufficient internal consistency for each subscale ($\alpha > 0.70$) (Wallston, Stein, & Smith, 1994). (See Appendix J for the full measure.)

Satisfaction with Life Scale (SLS). The Satisfaction with Life Scale (SLS) is a short 5-item measure designed to assess global cognitive judgments of satisfaction with one's life (Deiner et al., 1985). Research findings suggest that regular exercisers are more satisfied with their life, than non-exercisers (Stubbe, de Moor, Boomsma, & de Geus, 2007). The SLS has been used with diverse populations (Pavot & Diener, 1993). The SLS consists of five items, to which participants responded on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scores from the items were summed to derive a total score ranging from 5 (*low satisfaction*) to 35 (*high satisfaction*). The SLS demonstrates good predictive and convergent validity (Pavot, Diener, Colvin, & Sandvik,

1991) and has been negatively correlated with measures of depression and negative affect (Larsen, Diener, Emmons, & Griffin, 1985). The SLS also demonstrates high internal consistency ($\alpha = 0.83$) (Pavot et al., 1991). The SLS is demonstrated to be reliable with good test-retest reliability of $r = 0.85$ (Pavot et al., 1991). (See Appendix K for the full measure.)

Qualitative Data

Interviews. Interviewing techniques were used in conjunction with quantitative data collection in order to obtain the data necessary for the study. Semi-structured interviews were conducted because the method provided access to the context of people's behaviors, which allowed the researcher to understand the meaning of that behavior (Seidman, 1998). This notion follows the assumption that the meaning people make of their experience affects the way in which they carry out that experience (Seidman, 1998). An interview guide was the instrument used to facilitate the interviews (see Appendix L). The purpose of the study guided the development of the research questions. The researcher was then able to determine what information would be needed to answer the research questions, and from this information the interview questions were developed

that contributed both thematically and dynamically to the interview (Kvale & Brinkmann, 2008).

The interview guide was designed to inform the research questions not addressed using quantitative data, and was informed by existing literature. The interview guide consisted of four areas of inquiry. The first section consisted of basic background information regarding enrollment into the larger study, as well as previous physical activity experience. Questions such as "Why did you enroll in the Fit 4 Life study?" and "What were your sport, exercise and physical activity experiences as a young adult?" were asked.

The second section explored the concept of culture and cultural influences on exercise behaviors and motivations. Questions such as "What does the expression 'African American culture' mean to you?" and "In what ways do you feel your culture facilitates your being healthy?" were asked in this section.

The third section focused on the individual's experience of adopting and maintaining the aerobic exercise program, or lack thereof. Some of the questions included in this portion of the interview were: "What challenges do you face in adhering to the exercise program?" and "How do you feel exercise contributes to your overall health?"

The final section served to provide the participants the opportunity to reflect on their overall experience in the study. Some questions included: "Describe the features of an exercise program that would best meet your needs." and "Has your attitude toward exercise changed from the time you enrolled in the study? And if so, how?" (The complete interview guide can be found in Appendix L.)

Author as Instrument

I am a 28 year old African American woman with an interest in the role of exercise on chronic disease prevention, and in helping individuals adopt physically active lifestyles. My interest in kinesiology stemmed from my involvement with sports, such as cheerleading and track and field, at an early age. While my interest and dedication to sports waned as I began to consider my educational and career endeavors, my interest in kinesiology persisted. As a result, I majored in Health and Human Performance for my undergraduate degree. My interests in kinesiology have spanned a wide range, from personal training and sport-specific strength and conditioning, to cardiac rehabilitation, and exercise and sport psychology. Though my interests have evolved over time, my desire to help others in their active pursuits has persevered.

As an African American, I have witnessed first-hand how African Americans suffer from disproportionate amounts of chronic conditions, such as obesity and hypertension, and the "culture" that surrounds these diseases. As an adolescent, and still today, I have observed that the prevalence of these diseases in the African American community seems to be so commonplace, they are the accepted norm. I know many individuals in my community who have little knowledge of the etiology of chronic diseases, and the differences between conditions that are influenced or attenuated by living a healthier lifestyle and those that are not. Anecdotally, this lack of knowledge transcends age, religion, income, and education. This lack of knowledge seems to have created a culture of learned helplessness where people feel they have little or no control over the outcome of living healthfully. I believe that this perceived lack of control comes from lack of empowerment. Further, I believe knowledge, motivation, and empowerment (or lack thereof), exist in a reciprocal relationship. If you change one, it will affect the others. My knowledge of kinesiology has empowered me to understand that many chronic conditions can be prevented and/or treated through lifestyle interventions, and my desire is to empower others.

My grandfather suffered a heart attack requiring triple-bypass surgery, at the age of 70. I was three years old at the time. I recall my mother telling me about how my grandmother made changes in the way she cooked, ultimately changing my grandfather's diet. I also remember my grandparents taking me to the track every morning (they cared for me while my parents worked, rather than me attending daycare) and I would play on the jungle gym while they walked their laps. If I were asked to describe my grandfather in one sentence, I would say that he had an unwavering faith in God. When "grandfathering" his grandchildren, he often used the adage "God helps those who help themselves." This adage can be applied to many life circumstances, but I think my grandfather exemplified its meaning in the lifestyle changes he made later in his life. He lived to be 92.

Finally, as a member of the Fit 4 Life research team, I have knowledge of the various visits and procedures, as well as knowledge of the time commitment required from the participants, due to involvement in the study. Further, I have had the opportunity to build rapport over time with many participants in the study. For these reasons, the researcher acted as the instrument in this study. These

experiences have helped shape who I am and therefore influenced my analysis of the data.

Data Analysis

After the interviews were completed, the audio recordings were transcribed verbatim. The researcher was responsible for all of the transcribing. Transcriptions were then checked for accuracy. In a further effort to ensure results from the study were valid and trustworthy, each participant was emailed a copy of his or her transcript to review; however, no participants responded to the researcher's request for feedback regarding the accuracy of the transcripts. Thematic analysis, the process of identifying, reporting, and analyzing data in order to find the meaning produced by people, situations, and events, was utilized (Braun & Clarke, 2006). Thematic analysis consists of three stages: (1) descriptive coding, (2) interpretive coding, and (3) generating overarching themes (Braun & Clarke, 2006; King & Horrocks, 2010). Descriptive coding consists of segmenting the data and identifying parts that address the research questions in order to define codes. Interpretive coding requires the researcher to cluster descriptive codes and interpret the meanings of clusters in relation to the research questions, and overarching themes which characterize key concepts in

the analysis are identified (King & Horrocks, 2010). Within-case analysis was conducted, paying particular attention to commonalities among groups. Cross-case analyses were used to compare findings between groups (i.e., adherers and non-adherers) and identify commonalities and differences.

The researcher, as well as an independent second coder, reviewed the interview transcripts. Upon completion of descriptive and interpretive coding, the researcher and second coder agreed on common themes from the interviews. Finally, the overarching themes from the interviews were established. ATLAS.ti v6.2 qualitative data analysis software was used to assist in the processes of transcribing and analyzing interview data. In order to increase data credibility and "trustworthiness" (Kvale & Brinkmann, 2008), each coder independently identified and coded raw data themes (i.e., quotations) based upon the research questions of the study. Consensus validation of the emerging themes and supporting quotations proceeded until researchers reached an agreement.

Both qualitative and quantitative research methods were used for data collection in this study. Quantitative data were analyzed using the Statistical Package for the Social Sciences version 19. Descriptive statistics were

run on demographic data. Chi square and unpaired t tests were conducted to compare baseline measurements of each variable between the two groups (i.e., adherers and non-adherers). Ordinal measures, such as exercise stage of change (SOC), were analyzed using nonparametric statistical analyses.

CHAPTER 4

RESULTS AND DISCUSSION

The purpose of this study was two-fold. The first purpose was to examine patterns of adherence and to describe the influences of demographic, psychosocial, physiological, and sociocultural variables on adherence among African Americans enrolled in the Fit 4 Life study. The second purpose was to determine follow-up exercise behaviors of participants previously enrolled in the Fit 4 Life study.

This chapter includes the results of the quantitative and qualitative analyses used to address the specific aims and research questions of the study. The content of this chapter is presented in the following subsections: (a) results for primary aim 1, (b) results for primary aim 2, (c) results for the secondary aim, (d) general discussion, (e) implications for researchers, and (f) implications for practitioners.

Results for Primary Aim 1

The first primary aim was to examine patterns of adherence among participants in the Fit 4 Life study and describe the relationships among demographic, psychosocial, and physiological variables and exercise adherence. The

total number of participants in this study was 75; however, varying numbers of participants completed all of the numerous tests and questionnaires comprised in this analysis. Numbers were as low as 48 for the Multidimensional Health Locus of Control (MHLC) scale. To that end, the researcher analyzed the data under the assumption that the missing data are missing at random, and analyzing the data collected will provide sufficient description of participants in this study.

Given the number of independent variables in this study, the preferred method of analysis would have been a hierarchical regression with a dichotomous criterion variable. Doing this type of analysis would have allowed the researcher to identify the variables which predicted exercise adherence; however, given the small sample size and the large number of predictor variables in this study, the researcher conducted correlation analyses. Correlation analyses allowed the researcher to identify variables which were related to exercise adherence among participants, and thereby present a "profile" of adherers and non-adherers using this information. While the results of the quantitative analysis should be interpreted with caution, this supplemental component of the study provides valuable description of the sample and phenomenon.

Results for Research Question 1.1

How do adherers and non-adherers differ in demographic characteristics? Descriptive statistics and Pearson chi-square analyses were used to summarize demographic information for the study participants, as well as evaluate differences between groups.

Participant Demographic Information. Descriptive statistics were conducted in order to analyze the study participants. An overview of demographic information for participants ($N = 75$) is provided in Table 3. Participants ranged in age from 40 to 71 years, with a mean age of 51.84 years ($SD = 6.49$). All of the participants in the Fit 4 Life study self-identified as being African American. In terms of gender, 64 (85%) of the participants were women, and 11 (15%) were men. More than 62% of participants held a bachelor's degree or higher. Forty-one percent of participants were married, and 65% were employed full-time. Approximately 40% had an annual household income greater than \$50,000, and the modal household size was 2 (mean 2.58 ± 1.32). Table 3 displays demographic information for study participants.

Differences between Adherers and Non-adherers.

Pearson chi-square analyses and correlations were conducted in order to examine differences in demographic

characteristics among adherers and non-adherers. A chi-square analysis was used to determine whether there was a significant difference between adherers and non-adherers in regards to household size. Results indicated that non-adherers lived in larger households ($M = 3.13$, $SD = 1.486$) than adherers ($M = 2.19$, $SD = 1.030$), and this difference was statistically significant ($t(53) = -2.782$, $p = .007$). The results can be found in Table 4.

A chi-square analysis revealed a trend among the occupational status of participants ($\chi^2(3) = 7.679$, $p = .053$). Nearly 82% of non-adherers, compared to 18% of adherers comprised the group of participants who were employed part-time. Results are in Table 5.

No significant differences were found among adherers and non-adherers in terms of age, gender, education, marital status, or income.

Results for Research Question 1.2

How do adherers and non-adherers differ in psychosocial characteristics? Descriptive statistics and Pearson correlations were used to summarize psychosocial data for the study participants, as well as evaluate differences between adherers and non-adherers.

Participant Psychosocial Data. Descriptive statistics were conducted to analyze data related to the participants'

responses to the psychosocial questionnaires. Psychosocial information was collected from the following questionnaires: Exercise Benefits/Barriers Scale (EBBS), Barriers Self-Efficacy Scale (BARSE), Multidimensional Health Locus of Control (MHLC) Scale, and the Satisfaction with Life Scale (SLS).

Exercise Benefits/Barriers Scale (EBBS) scores were collected for 50 out of the 75 study participants. EBBS scores were analyzed by calculating means for each of the subscales and total scores for both adherers and non-adherers, as well as calculating item means for both groups.

Table 3

Fit 4 Life Participant Demographic Information

Variable	N	%
Age (<i>N</i> = 75)	75	51.84(6.49)*
Race/Ethnicity (<i>N</i> = 75)		
African American	75	100.0
Gender (<i>N</i> = 75)		
Female	64	85.3
Male	11	14.7
Education (<i>N</i> = 56)		
HS Diploma/GED	14	25.0
Associate's Degree	5	8.9
Bachelor's Degree	17	30.4
Master's Degree	13	23.2
Doctorate/Professional Degree	5	8.9
Other	2	3.6

Marital Status (<i>N</i> = 58)		
Single	17	29.3
Married	24	41.4
Living with Another	1	1.7
Separated	5	8.6
Divorced	9	15.5
Widowed	2	3.4
Employment Status (<i>N</i> = 57)		
Full-time	37	64.9
Part-time	11	19.3
Not employed	3	5.3
Retired	6	10.5
Household Income (<i>N</i> = 57)		
\$0-14,999	3	5.3
\$15,000-\$29,999	4	7.0
\$30,000-\$49,999	13	22.8
\$50,000-\$74,999	15	26.3
\$75,000-\$99,999	8	14.0
\$100,000+	7	12.3
Prefer not to answer	7	12.3
Household Size (<i>N</i> = 55)		
1	12	21.8
2	17	30.9
3	14	25.5
4	9	16.4
5	1	1.8
6	1	1.8
7	1	1.8

Note: * denotes Mean(SD)

Table 4

Adherence and Household Size Frequencies

Household Size	Adherer	Non-Adherer
1 (%)	8 (66.7)	4 (33.3)
2 (%)	15 (88.2)	2 (11.8)
3 (%)	5 (35.7)	9 (64.3)
4 (%)	3 (33.3)	6 (66.7)
5 (%)	1 (100)	0 (0)
6 (%)	0 (0)	1 (100)
7 (%)	0 (0)	1 (100)
Total	32	23

Note: $N = 55$

Table 5

Adherence and Occupational Status Frequencies

Variable	Occupational Status								Total N
	Full-time		Part-time		Not Employed		Retired		
	n	%	n	%	n	%	n	%	
Adherer	24	64.9	2	18.2	2	66.7	3	50.0	31
Non-adherer	13	35.1	9	81.8	1	33.3	3	50.0	26

Note: $N = 57$

Separate samples t-tests compared means for the benefits, barriers, and total EBBS scores. Mean adherers' score for the EBBS was 140.23 ± 15.31 , and mean non-adherers' total score was 134.53 ± 13.99 . The difference between the means was not statistically significant. Average benefits subscale scores for adherers and non-adherers were 95.19 ± 12.05 and 93.95 ± 12.00 , respectively. There was no significant difference between

groups. Average barriers subscale scores for adherers and non-adherers were 44.97 ± 6.06 and 40.58 ± 3.93 , respectively. Adherers scored significantly higher than non-adherers on the barriers subscale ($t(49) = 2.820$, $p = .007$), which indicates perceiving fewer barriers. The results are shown in Table 6.

Table 6

EBBS Benefits, Barriers, and Total Means

	Adherer(SD)	Non-adherer(SD)	t-value	Sig.	Effect Size
Benefits	95.19(12.05)	93.95(12.00)	0.355	.724	.103
Barriers	44.97(6.06)	40.58(3.93)	2.820	.007**	.860
Total	140.23(15.31)	134.53(13.99)	1.319	.193	.389

Note: Benefits scale data presented for adherers ($n = 31$) and non-adherers ($n = 19$). Barriers scale data presented for adherers ($n = 32$) and non-adherers ($n = 19$). Total EBBS data presented for adherers ($n = 31$) and non-adherers ($n = 19$). $N = 50$

**Significance at the 0.01 level (2-tailed).

Independent t-tests were used to compare adherers' and non-adherers' responses to each item. There were no significant differences in responses to benefits items (see Table 7). Adherers had significantly higher scores for two barriers items: exercise tires me ($t(49) = 3.141$, $p = .003$) and my family members do not encourage me to exercise ($t(49) = 2.802$, $p = .007$). Response means for barrier items can be found in Table 8.

An independent t-test compared Barriers Self-Efficacy Scale (BARSE) response means for adherers and non-adherers.

There were no significant differences between groups. BARSE results can be found in Table 9.

A t-test compared adherers' and non-adherers' mean scores on each of the Multidimensional Health Locus of Control (MHLC) subscales: internal, chance, doctors, and other people. There were no significant differences between groups. Means can be found in Table 10.

Independent t-tests compared Satisfaction with Life Scale (SLS) response means for adherers and non-adherers. There were significant differences in the means of four of the five items, with adherers significantly higher than non-adherers on all items. Item and total means for each group can be found in Table 11.

Table 7

Adherer and Non-adherer Means and Standard Deviations for Exercise Benefits (EBBS) Items

Benefits	AD(SD) n = 31	NAD(SD) n = 19
Increases physical fitness	3.71(.461)	3.63(.496)
Personal accomplishment	3.68(.599)	3.47(.905)
Decreases stress/tension	3.61(.558)	3.63(.496)
Improves cardio functioning	3.61(.615)	3.67(.485)
Increases muscle strength	3.55(.506)	3.68(.478)
Improves mental health	3.52(.626)	3.58(.692)
Improves flexibility	3.52(.508)	3.53(.513)
Improved physical appearance	3.48(.626)	3.47(.513)
Muscle tone improves	3.45(.506)	3.58(.607)
Improves self-concept	3.42(.620)	3.16(.834)
Increases stamina	3.39(.615)	3.47(.513)
Improved feelings of well-being	3.35(.608)	3.42(.507)
Enjoy exercise	3.35(.709)	2.95(.848)
Prevent heart attacks	3.32(.599)	2.95(.970)
Improves way body works	3.32(.599)	3.42(.607)
Improves body functioning	3.32(.599)	3.42(.607)
Prevent high blood pressure	3.30(.702)	3.47(.612)
Makes me feel relaxed	3.29(.783)	3.17(.618)
Increases mental alertness	3.29(.588)	3.22(.732)
Live longer	3.20(.664)	3.26(.562)
Sleep better	3.19(.749)	3.32(.671)
Normal activities without tiring	3.16(.638)	3.42(.607)
Disposition improves	3.16(.688)	3.32(.671)
Improves quality of work	3.13(.629)	3.16(.765)
Helps me decrease fatigue	2.97(.795)	3.16(.688)
Meet new people	2.87(.619)	2.67(.594)
Good entertainment	2.84(.735)	2.83(.924)
Contact with friends	2.81(.792)	2.56(.784)
Increases acceptance by others	2.58(.720)	2.39(.608)
MEAN - Benefits Subscale	3.29	3.28

Note: AD = adherer, NAD = non-adherer; A higher benefit mean indicates a strong positive perception of the exercise benefit. N = 50

Table 8

Adherer and Non-adherer Means and Standard Deviations for Exercise Barriers (EBBS) Items

Barriers	AD(SD) n = 32	NAD(SD) n = 19
Exercise tires me*	2.81(.693)	2.17(.707)
Feel fatigued	2.84(.677)	3.00(.745)
Exercise is hard work	2.97(.822)	2.58(.838)
Spouse doesn't encourage	3.06(.759)	2.65(.862)
Too far away	3.09(.641)	2.95(.705)
Takes too much time	3.13(.660)	2.68(.946)
Too few places	3.16(.767)	3.16(.501)
Costs too much	3.22(.751)	3.16(.765)
Inconvenient schedule	3.22(.792)	3.05(.621)
Family doesn't encourage*	3.22(.659)	2.67(.686)
Time from family relations	3.50(.622)	3.33(.582)
Time from family duties	3.53(.621)	3.17(.618)
Clothes look funny	3.56(.619)	3.47(.513)
Too embarrassed	3.66(.545)	3.26(.933)
MEAN - Barriers Subscale	3.21	2.95

Note: AD = adherer, NAD = non-adherer; A lower barrier mean indicates greater negative perception of the exercise barrier. N = 51

*Significance at the 0.01 level.

Results for Research Question 1.3

How do adherers and non-adherers differ in physiological characteristics? Descriptive statistics, Pearson correlations, and chi-square analyses were used to summarize physiological data for the study participants, as well as evaluate differences between adherers and non-adherers.

Table 9

Barriers Self-Efficacy Scale (BARSE) Means

	Adherer(SD)	Non-adherer(SD)	t-value	Sig.
Bad weather	72.19(23.93)	74.21(26.52)	-.280	.780
Bored with activity	53.13(29.45)	54.21(25.02)	-.134	.894
On vacation	64.38(29.94)	61.11(30.66)	.367	.715
Not interested	47.50(32.63)	46.11(26.60)	.154	.878
Pain or discomfort	39.06(30.20)	51.11(33.76)	-1.298	.201
Exercise alone	71.56(35.93)	75.79(24.79)	-.452	.653
Not enjoyable	56.88(29.78)	53.16(28.49)	.438	.663
Difficult location	60.00(29.29)	47.89(25.29)	1.499	.140
Didn't like program	51.88(33.35)	48.42(24.56)	.392	.697
Conflicting schedule	52.81(28.76)	41.58(21.15)	1.479	.146
Appearance	64.06(32.61)	58.42(31.32)	.606	.547
No encouragement	67.81(34.43)	65.79(28.74)	.215	.830
Personal stress	60.00(30.59)	56.84(21.88)	.394	.696
BARSE Total	58.56(23.10)	56.43(17.03)	.349	.729

Note: N = 51

Table 10

Multidimensional Health Locus of Control (MHLC) Subscale Means

	Adherer(SD)	Non-adherer(SD)	t-value	Sig.
Internal	25.67(5.88)	25.50(4.97)	.101	.920
Chance	12.63(5.42)	14.44(5.10)	-1.145	.258
Doctors	14.37(2.80)	13.11(2.63)	1.538	.131
Other people	7.00(3.14)	7.83(3.62)	-.841	.405

Note: N = 48

Table 11

Adherer and Non-adherer Means and Standard Deviations for Satisfaction with Life Scale (SLS) Items

SLS Item	Adherer(SD) n=32	Non-Adherer(SD) n=17	t-value	Sig.	Effect Size
Close to my ideal	4.13(1.83)	3.29(1.86)	1.505	.139	.455
Conditions are excellent	4.69(1.55)	3.00(1.73)	3.477	.001**	1.030
Satisfied with my life	4.88(1.66)	3.59(1.62)	2.602	.012*	.787
Important things	5.41(1.39)	4.00(1.94)	2.654	.014*	.836
Change almost nothing	4.06(1.90)	2.53(1.74)	2.768	.008**	.840
Total	23.16(6.65)	16.41(6.93)	3.330	.002**	.994

Note: N=49

**Significance at the 0.01 level (2-tailed).

*Significance at the 0.05 level (2-tailed).

Participant Physiological Data. Descriptive

statistics were conducted to analyze data related to the participants' physiological characteristics. The mean values for total cholesterol among participants was 192.68 mg/dL (SD = 25.83), which is categorized as a desirable level, according to the National Cholesterol Education Program (2002). The mean triglycerides was 90.28 mg/dL (SD = 39.55), which is classified as normal. The mean HDL level was 63.23 mg/dL (SD = 18.85), which is classified as a high level considered to have protective effects against heart disease, and the average LDL level of 111.27 mg/dL (SD = 24.35) is near or above optimal (NCEP, 2002). The

mean fasting glucose was 95.54 mg/dL ($SD = 9.42$) which is in the normal range (AHA, 2012).

The mean systolic blood pressures prior to the completion of the dietary stabilization period and at baseline for the sample were 128.07 mmHg ($SD = 9.73$) and 126.32 mm Hg ($SD = 13.42$), respectively. Mean diet and baseline diastolic blood pressures were 81.82 mm Hg ($SD = 7.03$) and 81.21 ($SD = 8.93$), respectively. These blood pressure values are classified as prehypertensive, according to the JNC7 (2004). Mean body mass index was 32.58 kg/m² ($SD = 5.5$), and mean body fat percentage was 42.57 ($SD = 7.36$). These values are indicative of obesity among participants. Mean VO_2 peak and VO_2 regressions were 21.15 ml/kg/min ($SD = 4.27$) and 25.75 ml/kg/min ($SD = 5.49$), respectively, indicating that participants were sedentary. Participants' physiological data are summarized in Table 12.

Differences between Adherers and Non-adherers.

Separate samples t-tests were conducted in order to compare the similarities and differences with regards to 18 physiological characteristics among adherers and non-adherers. The comparison of the two groups can be found in Table 13.

Statistical significance was found between adherers and non-adherers in terms of diastolic blood pressure during the dietary stabilization period, diastolic blood pressure at baseline, weight, body mass index, resting metabolic rate, and fat mass. Adherers had significantly lower scores for each measure. There were no significant differences with regard to other physiological measures.

Table 12

Physiological Characteristics of Fit 4 Life Participants

Variable	N	Mean (SD)
Cholesterol (mg/dL)	74	192.68(25.83)
Triglycerides (mg/dL)	74	90.28(39.55)
HDL (mg/dL)	74	63.23(18.85)
LDL (mg/dL)	74	111.27(24.35)
Glucose (mg/dL)	74	95.54(9.42)
Diet SBP (mmHg)	74	128.07(9.73)
Diet DBP (mmHg)	74	81.82(7.03)
Baseline SBP (mmHg)	75	126.32(13.42)
Baseline DBP (mmHg)	75	81.21(8.93)
Height(cm)	74	167.33(6.18)
Weight(kg)	74	91.47(17.03)
Body Mass Index (kg/m ²)	74	32.58(5.5)
Resting Metabolic Rate (kcal/day)	53	1458.96(238.70)
VO ₂ Peak (ml/kg/min)	73	21.15(4.27)
VO ₂ Regression (ml/kg/min)	74	25.75(5.49)
Fat Free Mass (kg)	74	51.26(9.17)
Fat Mass (kg)	74	38.35(11.95)
Body Fat(%)	74	42.57(7.36)

Note: HDL = high-density lipoprotein; LDL = low-density lipoprotein; SBP = systolic blood pressure; DBP = diastolic blood pressure

Table 13

Independent t-tests Comparing Physiological Characteristics of Adherers and Non-adherers

	Adherers		Non-Adherers		Sig.	Effect Size
	n	Mean(SD)	n	Mean(SD)		
Chol	38	189.45(25.17)	36	196.08(26.43)	.272	.257
TriG	38	83.34(35.57)	36	97.61(42.63)	.122	.363
HDL	38	66.18(19.31)	36	60.14(18.11)	.170	.323
LDL	38	106.42(21.37)	36	116.39(26.48)	.078	.414
FGlu	38	94.16(10.21)	36	97.00(8.40)	.197	.304
DietSBP	38	127.55(10.22)	36	128.61(9.30)	.643	.109
DietDBP	38	80.05(6.51)	36	83.69(7.16)	.025*	.532
BLSBP	38	123.87(12.57)	37	128.84(13.96)	.109	.374
BLDBP	38	79.07(7.11)	37	83.39(10.10)	.035*	.495
HT(cm)	38	167.20(5.64)	36	167.47(6.79)	.851	.043
WT(kg)	38	86.78(18.21)	36	96.42(14.32)	.014*	.588
BMI	38	30.88(5.49)	36	34.38(4.97)	.005**	.668
RMR	28	1390.89(238.03)	25	1535.20(219.66)	.027*	.630
VO ₂ Peak	36	21.41(4.43)	37	20.90(4.07)	.611	.120
VO ₂ Reg	37	26.25(5.85)	37	25.26(5.13)	.443	.180
FFM	38	49.87(8.88)	36	52.72(9.38)	.183	.312
FM	38	35.66(12.01)	36	41.19(11.36)	.046*	.473
BF(%)	38	41.71(8.18)	36	43.49(6.36)	.303	.243

Note: Chol = cholesterol; TriG = triglycerides; HDL = high-density lipoprotein; LDL = low-density lipoprotein; FGlu = fasting glucose; SBP = systolic blood pressure; DBP = diastolic blood pressure; HT = height; WT = weight; BMI = body mass index; RMR = resting metabolic rate; VO₂Reg = VO₂ regression; FFM = fat free mass; FM = fat mass; BF = body fat
 **Significance at the 0.01 level (2-tailed).
 *Significance at the 0.05 level (2-tailed).

Results for Primary Aim 2

The second primary aim was to explore the roles of culture and social context in the process of exercise behavior change for participants in the Fit 4 Life study. In order to address the second primary aim, the researcher conducted nine semi-structured interviews with purposefully recruited participants. Interview participants were selected from individuals who finished baseline testing and completed and returned the packets containing the quantitative measures. Five adherers and four non-adherers were interviewed. A list of interviewee demographic information may be found in Table 15.

Using the procedures described in Chapter 3, the researcher conducted a thematic analysis of the interview data collected from adherers and non-adherers. Raw data themes emerged from the participants' descriptions of their experiences with beginning and maintaining an exercise program. These descriptive raw data themes were organized into sub-themes, and then overarching themes, which characterize key concepts in the analysis, were established.

Four overarching themes emerged from the analysis of interview data collected on Fit 4 Life participants. These four themes were: *benefits*, *barriers*, *facilitators*, and

African American. The themes and subthemes have been organized and presented in a way that facilitates an understanding of participants' experiences with exercise and in the Fit 4 Life study, and presents strategies to foster participation and adherence among African Americans. Figures are provided to outline the process of thematic analysis, as well as supplement the interview data. Each figure lists the raw data themes, accompanied by the number of times that particular concept emerged as an individual construct within the interviews.

Table 14

Interview participants' demographic information

	Pseudonym	Gender	Age	Occupation
Adherers	Harriet	F	62	Retired administrative assistant
	Haven	M	56	Social worker
	Sharon	F	57	University administrator
	Clyde	M	44	Social worker
	Geraldine	F	42	Learning Specialist
Non-adherers	James	M	48	Computer programmer
	Gwen	F	65	Crossing guard
	Pam	F	63	Human services
	Donna	F	55	Realtor

In order to find commonalities and variations in the participants' experiences of the process of adopting and maintaining an exercise program, the researcher utilized both within-case and cross-case analytic strategies. These

strategies encompassed the following: (1) analytic immersion in all interviews, which allowed the researcher to gain a sense of the lived experience of the phenomenon, (2) immersion in each interview, in order to identify significant statements, and (3) comparison of significant statements and raw data themes in order to identify commonalities and differences within and among groups. It is important to note that the same themes occurred across both groups; however, in some cases, the interviewees' accounts provided different realizations of those themes. These realizations are discussed throughout the interview results and discussion sections. Raw data theme counts used for within-case and cross-case analyses can be found in Appendix M.

Theme 1 - Benefits of Exercise and Physical Activity

The first theme that emerged - benefits of exercise and physical activity - focused on participants' perceived utility of exercise and physical activity. The participants' responses relative to this theme are divided into two subthemes: (a) cognitive/mental benefits, and (b) physical benefits. A diagram outlining the raw data themes and subthemes related to benefits of exercise and physical activity can be found in Figure 3.

Cognitive/mental benefits of exercise and physical activity. Each of the participants discussed cognitive/mental benefits of exercise and physical activity participation, though adherers referred to these benefits more frequently than non-adherers. Participants were asked to identify short- and long-term benefits of exercise; however, the majority of references to these benefits emerged organically in their narratives, and not in response to the indicated questions (e.g., what do you believe are the short-term benefits of exercising?).

The most commonly cited cognitive/mental benefit was self-efficacy. Self-efficacy was discussed in terms of participants' abilities to complete exercise tasks, as well as the associated positive affect in response to being able to overcome barriers to exercise. Harriet, an adherer, simply stated: "Once I got started, I was okay. I learned that I can actually do the elliptical...I'm impressed!" James, a non-adherer, also discussed self-efficacy in terms of his ability to complete physical tasks and overcome mental barriers:

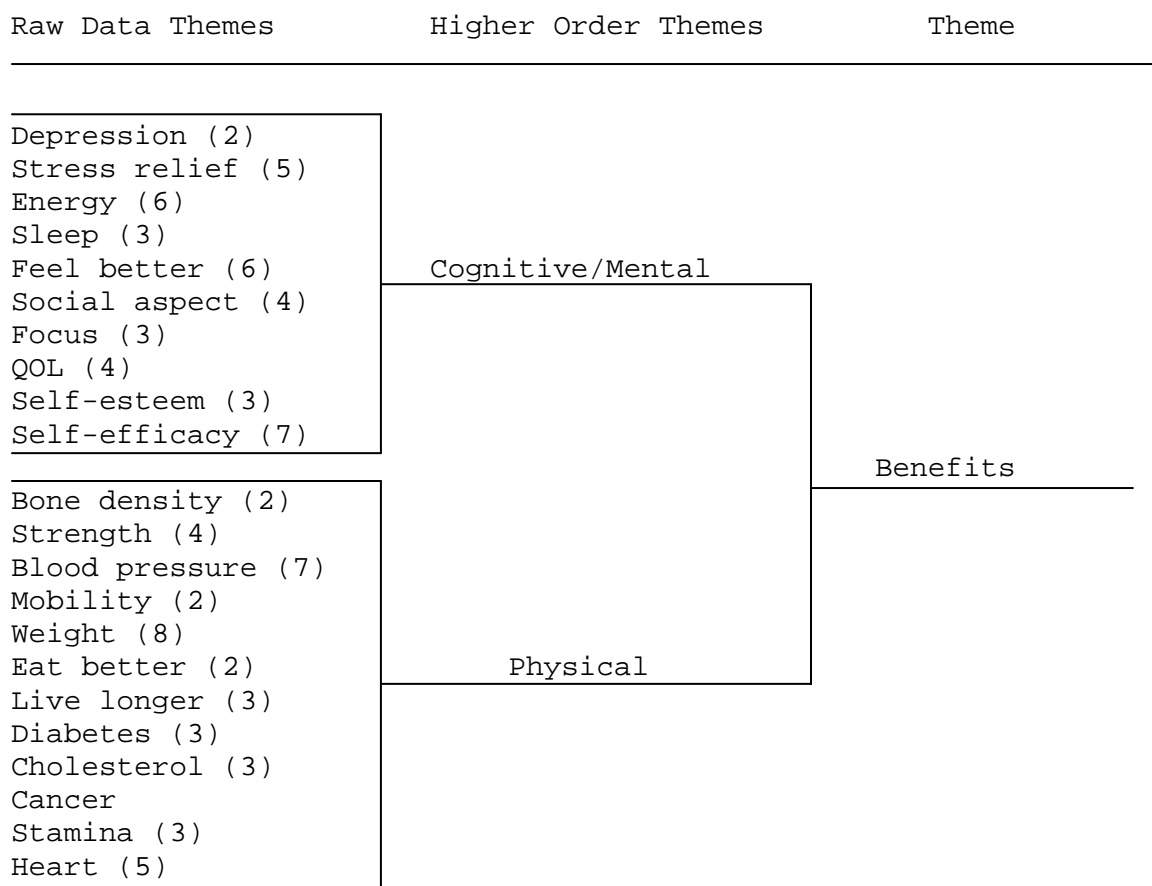


Figure 3. Participants' perceived benefits of exercise.

Note: Total of 22 raw data themes. Numbers in parentheses indicate number of times theme emerged as an individual idea (when greater than one).

QOL = quality of life

I think the biggest short-term benefit that I've really, really enjoyed is the sense of accomplishment. I did something today that I may not have wanted to do, but after it's gotten done, I can look back and say, "Today I worked out, and it was something that I may not have 100% wanted to do, but it was something that was needed, and I appreciate my ability to actually physically be able to do it and get it done." It's like a sandcastle in a sense; you build a foundation and then you get better and better.

Both adherers and non-adherers regarded energy as an additional important benefit of exercise participation. When asked what she believed would happen if she didn't exercise regularly, Geraldine, an adherer, talked about energy and recognized other mental health benefits as well:

Um, one, I think my energy level would go back down . . . I think the depression would set in, you know, just thinking. And also, I think just constantly thinking, "Oh my God, is it going to be me in five years that's going to have a heart attack and die?" Cause you know, I do be stressed from work, from my job, so I know that carrying the stress and carrying the burden of certain things, um, is a lot, so just to be able to release that is a big deal.

Participants shared similar sentiments regarding the effectiveness of exercise in helping to cope with stressors, aiding in sleep, feeling better, socializing with others, increasing self-esteem, improving one's ability to focus, and improving quality of life. Sharon, an adherer, discussed her preference for exercise in the morning, stating "...it set the tone for the day. It felt like I'd done something for me. My mind was clearer, uh, I had more energy. We need more of that and less coffee in the morning." Pam, a non-adherer, discussed what she believes happens when she doesn't exercise: "Internally, you're dormant...I feel (pause) lax. I feel too reserved. Then when I would have my good workout I feel alert, and just bountiful, and tuh-tuh-tuh-tuh (sings and extends arms

and flexes).” In all, participants generated a list of 10 cognitive/mental benefits of engaging in exercise and physical activity.

Physical benefits of exercise and physical activity.

While participants realized several cognitive/mental benefits of exercise in the interviews, the number of times physical raw data themes were cited, indicated that physical benefits may be more evident to participants.

(See Appendix M.) Of the 12 physical benefits participants identified, the most commonly cited was weight control.

Adherers, however, mentioned weight more than non-adherers. When discussing the long-term benefits of exercise, Sharon, an adherer, stated:

Well, I can see the change it (exercise) makes in my body. I can see like muscles getting leaner, I mean they're not bulky or anything, but if I do it over a sustained period of time, like when I did For 4 Life, I actually lost eight pounds and my clothes fit. I was so happy! Now, I'm putting the weight back on because I'm not doing the things I should be doing.

Harriet, an adherer, discussed weight and its relation to chronic health conditions:

... If you don't exercise regularly and still eat? You gain the weight! That's a definite. Um, then when you gain the weight, you have all the other problems that it could lead to, like I said, diabetes, heart problems, blood pressure. Things like that.

Other commonly cited benefits of exercise were lowering blood pressure and promoting heart health. When

describing what she believed the long-term benefits of exercise were, Gwen, a non-adherer, expressed how exercising may make one engage in other healthy behaviors, such as eating better:

... you'll lose weight, uh, and it just helps your overall health. You know, your heart... uh, your cholesterol. I mean everything would be better. It keeps you healthy. Yeah, and then you'll find that once you really get into it, and you start losing weight and you can start seeing the difference in yourself. You won't eat the potato chips. You'll pick up an apple, you know?

Other physical benefits participants recognized included increases in strength, mobility, stamina, and improved bone density.

Theme 2 - Barriers to Exercise and Physical Activity

The second theme that emerged - barriers to exercise and physical activity - focused on the various factors participants perceived to hinder participation in exercise and physical activity. The participants' responses relative to this theme are divided into three subthemes: (a) personal barriers, (b) community barriers, and (c) study barriers. A diagram outlining the raw data themes and subthemes related to barriers of exercise and physical activity may be found in Figure 4.

Personal barriers. The subtheme personal barriers entailed barriers the participants experienced that

hindered their exercise participation prior to and after their enrollment in the Fit 4 Life study. Each of the participants stated that their friends and family members, important sources of social support, were sedentary. When asked if his friends and family were physically active, Haven, an adherer responded:

Shhh (laughs). I tried to get my wife - so after I finished the program, right, I joined a gym, right. And my wife went one time. So it's a - I don't know. A few friends I know, they go to the gym. But most of them, they not uh - I guess they do what they do. I guess they feel like whatever they're doin is enough activity.

Similarly, Donna, a non-adherer stated:

...just among my friends, I had to go out of my group - social group - to find others to do some of those things...And that's okay, I do that for myself, but in my social circle it be hard to say, "Come on, let's do yoga." They'd be like, "What?" (laughs).

Other participants, both adherers and non-adherers, expressed frustration with their friends and families' unhealthy lifestyles. Donna, a non-adherer who has been a vegetarian for 36 years, demonstrated her frustration with her family's lack of physical activity and unhealthy eating behaviors:

They do not exercise. They do not eat a quality diet...and they're diabetics, high cholesterol, high blood pressure. So I'm the only one in the family that's say, health-conscious...So for me it's gotten to a point where you got to leave people where they at. Everybody ain't for the saving...I am tired of talking. You know, lead by example.

Finally, Geraldine, an adherer, explained that her friends and family are attempting to become more physically active; however, she reflected upon the motives accompanying their behavior:

Like my cousins, they're all overweight. They obese (laughs). They are. Cause when you think about it, it's unfortunate because they all are younger than me, and they all are like obese. They're going to the gym now, but it's more about their looks than about being healthy. It's about, "Okay, I need to be able to date. I want to go out, I want to meet people." It's more about that. That's the reason why they want to lose weight or get in shape, as opposed to their health. Cause I don't think they really believe their health is in danger or in jeopardy. It's about, "How I look."

In addition to having sedentary friends and family, several participants cited their jobs as salient personal barriers. Sharon, a university administrator, discussed the impact of her job on her physical activity level:

Well, I - it's a constant challenge for me to, as I get older, um, to remain active - physically active because of my job which is, well you know. I'm in an office, I sit a lot during the day, and I'm up and moving around a lot, but it's not the type of physical activity I need to stay healthy.

She continued to reflect on her constant struggle with her job and making time for herself in order to maintain her health:

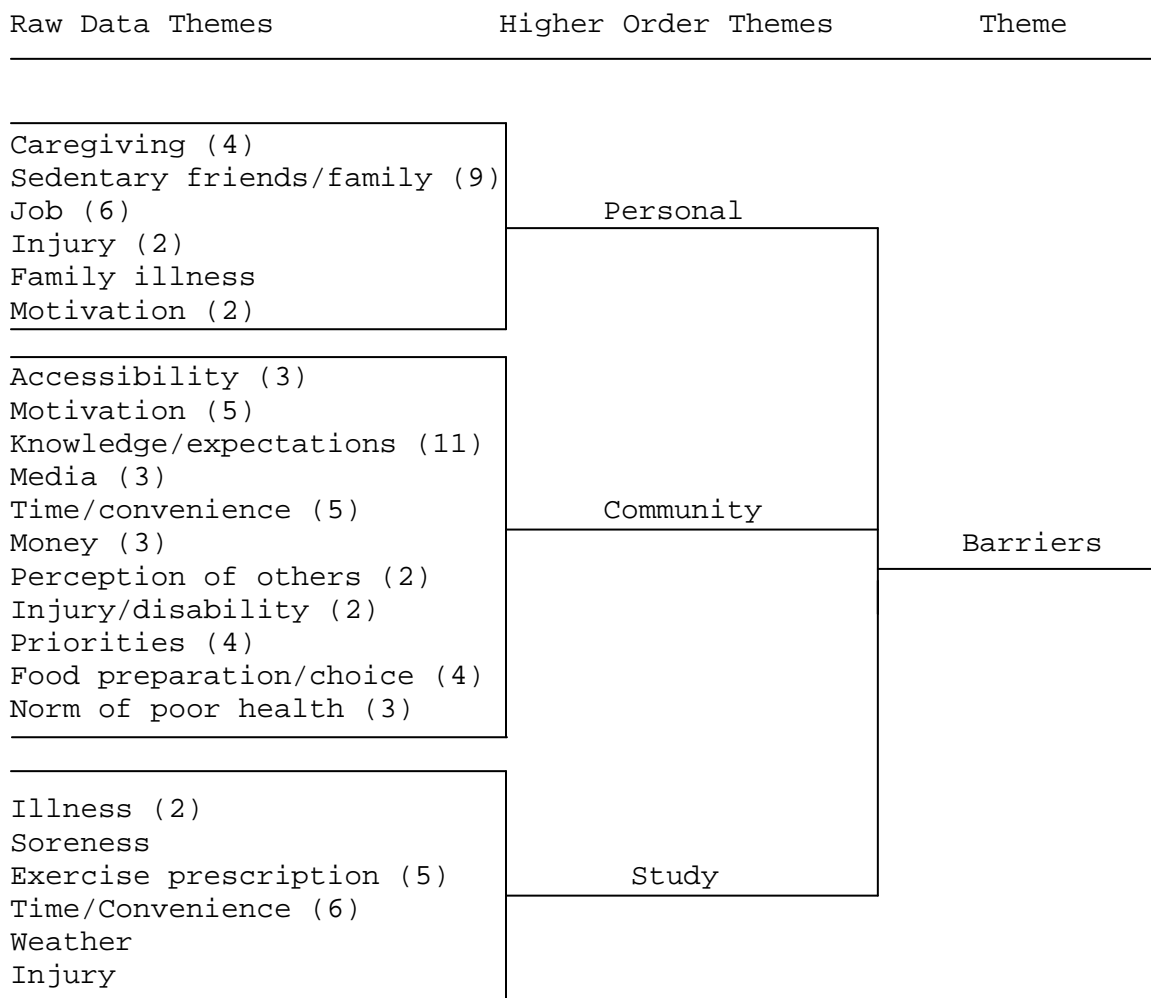


Figure 4. Participants' perceived barriers of exercise.

Note: Total of 23 raw data themes. Numbers in parentheses indicate number of times theme emerged as an individual idea (when greater than one).

...when I had that incident with my heart, when they thought it was a heart attack, but it was stress. I was working 75 hours a week. I would get in at 6, stay until 8, and come in on the weekends cause I had no help, and it was really, really tough all the stuff I had to do...I had - they hired someone for me...I felt like that time I was taking away (after the incident), I should be working that extra load.

Harriet, a grandmother who is recently retired, summarized her typical day before she retired. She highlights how she had to balance work with another common barrier - life at home and taking care of others:

...My grandson has always stayed with me...so you have to get him up, get him ready, you have to make him breakfast...so you take him to school, then you come to work, so you have to be to work at 8:30 so you have to have him at school by 8 o'clock. So you come in, then after you do your full day, but you can't quite do your full day because your grandson gets out of school at 4, so you say, "Hey, I gotta take a break", and you pick him up from school, then you bring him back to your job...Then you go home, then you fix dinner. Fix dinner, then you have to help him with his homework, so you see where that time is?

Even though Sharon had previously explained how work posed a significant barrier for her, she also discussed her role as a mother of three throughout her interview. When asked what she believed what some of the barriers were that people experience in regard to exercise, she stated, "Oh gosh! Family, especially if you're women. Family, it comes first."

It is important to note that while no male participants or non-adherers who were interviewed explicitly discussed caring for others, family was mentioned as a factor that hinders exercise participation. Other personal barriers participants noted were injury and lack of motivation.

Community barriers. The second subtheme, community barriers, included barriers participants believed hindered others' exercise participation, as well as their own. Community-level barriers underscore the social context in which participants strive to be physically active. In their narratives regarding community-level barriers to exercise, participants discussed both societal barriers and barriers specific to the African American community; however, they spoke primarily of barriers in relation to African Americans. To that end, there is significant overlap among community barriers discussed in this section and culturally specific barriers. These culturally specific barriers are addressed in depth in relation to the theme, *African American*.

One commonly cited community-level barrier was related to knowledge and expectations. Seven participants believed that many people are not aware of the benefits of exercise, don't know how to exercise, or have misconceptions about exercise. Geraldine, an adherer, stated:

I think one of the biggest things, I know um, for African Americans, and even not, is just not knowing how important exercising *is*...cause people don't believe that walking or any of that is exercising. They think they need to go to a gym...

Other misconceptions may be related to health, in general. Gwen, a non-adherer, stated, "...like I said before, some

people think they're perfectly healthy because they don't have any aches and pains the way they are. Then it may be too late. The first ache may be the last."

Each of the male interviews, one adherer and two non-adherers, discussed how they believed the media misinforms people about exercise. Clyde, an adherer reflected:

I think a lot of people - and I think the media has something to do with it...they just focus on the summer, but they don't focus on the rest of your life. They only emphasize exercise during certain parts of the year. And so I think people feel they don't need to continue exercise because the summer's over, or you don't need to fit in a bathing suit anymore. Like Bally's and exercise gyms, they're guilty of it too. They don't push the benefits of exercise. The media doesn't really promote exercise as they should. They promote it like its some type of seasonal thing. Like the New Year resolution thing. Like people want to lose a certain amount of weight, and when they don't lose that weight or it's not easy to do, they stop. The media has a lot to do with it, but it comes down to what you want to do. In my situation, I knew I had to exercise. I knew I couldn't go on the way that I was...

James, a non-adherer, had a similar view:

So you take a person who looks at a book, magazine, or TV show, and we're very visual people in that sense. And then we visualize ourselves in that - we take the face off, put our face on, "Oh, I can look like that." So then we get up and walk around the block, or ride a bike, or push myself really hard, and then I'll look in the mirror the next day and go (sigh), "This ain't working" (laughs). "I have *fooled myself* into thinking that I could do that!" And the biggest challenge that people see is that, that which you see has another purpose...it's to make money, to buy whatever they're selling, and that discourages people to go forward because they're not getting the results they envisioned. It's the sort of thing where an

expectation is not being met in their mind, but the realization and the education of it is what's missing, you know?

Donna, a non-adherer, cited another barrier - lack of motivation. She stated, "...it's just lack of motivation, you know (pause) until something goes wrong, so it's like, "Let me try to do this and catch up." But there's no excuse, just laziness." When Gwen, a non-adherer was asked what she believed barriers to exercise are, she stated:

Just don't wanna. Because it's so simple to just take a walk! So to me, the only barrier would be - if you're not disabled some sort of way as far as your legs go - would be you! Not wanting to do it. Or saying, "Oh that's too far. I can't do that." Or, "I'll go tomorrow, then tomorrow, then tomorrow." So I would think the only reason for you not to do it is because you don't want to.

Haven, an adherer, discussed what he perceived barriers to exercise to be, highlighting both motivation and time:

...you got to be motivated. I guess that could be a barrier - lack of motivation. You know, some people just don't feel a need. You know, they feel like they're doing enough. But I think that they're always talking about doing it. It's like a procrastination thing. You procrastinate at the beginning, but it has to be in habit once they start doing it. Once they start doing it, uh, they enjoy it. But uh, I guess people's schedules, but again, I thought that was my biggest thing was that I didn't have time, but you know, in life you learn people have time to do what they want to do (laughs). You have time to do what you wanna do. So I don't accept that anymore...Like instead of going to a movie, go to the gym (laughs). Do that!

Other participants discussed issues related to time and convenience. Geraldine, an adherer, also cited time as a common barrier:

...And time, "I don't have time to do it," when reality is you can really set aside some time, cause I didn't think I would have time either until I got into it. And once you get into it, you make time for it like you do for anything else.

When asked what he learned from the Fit 4 Life study, Clyde, an adherer, acknowledged the difference in time and the perception of time as barriers to exercise:

Um, make time for exercise. If you have time to sit your couch and watch whatever soap opera, or whatever event on TV, then you have time to do something physical like walking around the block or something like that...It doesn't take much. There are 24 hours in a day. Just do something active.

Participants identified food preparation/choice as barriers to health. This theme was discussed primarily in reference to African Americans; however, Clyde discussed food choices in relation to time and convenience:

Well the thing with diet is, it's easier to get something fast, say from like McDonald's or a cheesesteak - it's easier to get something that's not healthy for you than to take the time to prepare something that is...You don't care about the calories, you don't care about the content that's in it...And eating fast food is quicker than preparing healthy food. That's when time plays a factor in my viewpoint. But you don't have to do that. You know, if you're going to go to McDonald's at least get a salad, or at least look for some type of alternative. You know something along those lines. But it all comes down to people's perceptions of time.

Other community barriers participants identified were lack of money, lack of accessibility, priorities, perceptions of others, and injury/disability. A final barrier, norm of poor health, is discussed under the theme *African American*.

Study barriers. This subtheme consisted of participants' perceived barriers specific to the research study. Issues related to time and convenience were the most commonly cited barriers to completion of the exercise training program component of the study. James, a non-adherer, encountered the two most common barriers to the program:

My biggest challenge was having to give my time. And actually, uh (pause) go by what the doctrine and the curriculum was set at. Even though I could do more, this is what they were looking for. So you had to basically stay within those parameters, don't do too much, don't do too less. And that was the basic part of it that, I kind of, I had a big challenge with, but understanding over all, this is why you're here. You're here to be a part of an experiment that's going to help, not just yourself, but hundreds past, and hundreds future.

Pam, a non-adherer, reflected upon her experience in the study, citing lack of time:

...the only disappointment I had, and that was within myself, was not being able to complete up to the six months of exercising. A whole lot of things was coming together and I had different meetings...And then trying to get there early in the morning wasn't good because of where I had to be on the job, and this, that, and the other. And the evening, having evening meetings on and on. So a lot of my prospective business planning stages got in the way of

me being there but I was able to work out at home, but that wasn't acceptable because I needed to be there for the exercise.

Issues related to the exercise prescription were cited by both non-adherers and adherers. James, a non-adherer discussed how the exercise prescription was his biggest barrier to adherence in the study:

My biggest challenge (laughs) was having to take my time. And actually uh, go by what the doctrine and the curriculum was set at. Even though I could do much more, this is what they were looking for. So you had to basically stay within those parameters, don't do too much, don't do too less. And that was the basic part of it that kind of - I had a big challenge with, but understanding over all, this is why you're here. You're here to be a part of an experiment that's not going to help, bout just yourself, but hundreds past, and hundreds future.

Adherers also had difficulty acclimating to the exercise prescription. Geraldine, an adherer, commented:

The pace I was able to go at the beginning was really, really slow, so I was like, "Hmm, I'm not going to be able to do this"...Yeah, it was too slow. In the beginning it was boring. I was like, "I need to move quicker than this."...So that's what, you know, it's like at the beginning, "You know I can jump rope faster than this, right?" (laughs) "Ya'll want me to do this for how long?" So yeah, that piece of it was hard.

Finally, Clyde, an adherer, stated:

You know, but there was a time when I wanted to be able to raise my heart rate from 140 to 160 or something! And not have to be harped on when I did go above 140! So my goal was to be able to complete the program.

In addition to the exercise prescription, illness was a barrier for adherers, but not cited by non-adherers.

Geraldine, an adherer, stated:

No, I think the only time I wouldn't get up and come or wouldn't feel like going is usually if I got sick and would have to be out. And then just coming back after that is hard, you know what I mean? Just motivating yourself to get back...but other than that I was good. I enjoyed coming, exercising. Or one of the kids got sick, you know what I mean?

Other study barriers participants cited were soreness when beginning the program, weather, and injury; however, these raw data themes were cited less frequently.

Theme 3 - Facilitators of Exercise and Physical Activity

The third theme that emerged - facilitators of exercise and physical activity - revolved around the factors participants believed encourage participation in exercise and physical activity. The participants' responses relative to this theme are divided into two subthemes: (a) personal facilitators, and (b) study facilitators. While these two separate subthemes have been established, it is important to note that overlaps in exercise facilitators exist. For example, exercising in the morning is a strategy participants utilized to stay currently active (i.e., personal facilitator); however, they also exercised in the morning during their time in the Fit 4 Life study (i.e., study facilitator). A diagram

outlining the raw data themes and subthemes related to facilitators of exercise and physical activity can be found in Figure 5.

Personal facilitators. The first subtheme focused on personal factors that influenced participants' exercise experiences, particularly strategies used in the process of maintaining an exercise regimen. Previous physical activity experience, particularly during adulthood, emerged as a facilitator. The most commonly cited activity participants participated in as adults, for both exercise and transportation, was walking. Each of the adherers and three of the non-adherers had participated in structured exercise at some point during adulthood. One participant had completed a half marathon as an adult. Donna, a non-adherer, recounted:

I used to really work out a lot. I used to run. I even ran the half marathon...Yeah, 13 miles...It had to be back in, I think it was the early 90s...Just trying to keep in shape. I was trying to exercise and I was running a lot, but didn't have a coach so I was doing it on my own. So I just signed up for it and started training, and almost killed myself in that (laughs). I ran like the two days before to make sure I really could run duh! But I did finish!

Another facilitator, enjoyment, was referenced by both adherers and non-adherers; however, non-adherers cited enjoyment twice as many times as adherers. Gwen, a non-

adherer who withdrew from the study due to injury,
explained how she managed to remain physically active:

...I found something that I really liked, and it's good exercise. Basically, unless a doctor said, "____, if you don't walk that treadmill for 30 minutes a day you'll die," I would walk the treadmill. But I would hate it all the time. You know what I mean? But I found something that I really like. I don't need to get motivated to go, and I'll go under my own steam. And, you know, I can do things I don't like. We all can. We all have. But something that's a choice - I mean if you have a choice, you'll do something you like, rather than me going cause the doctor said I'ma drop dead right now.

When asked how his attitude toward exercise had changed, Haven, an adherer, discussed some of the strategies he'd developed to help him stay physically active. Among them he mentioned the guilt and developing a routine:

Uh, you know what happens now, right, is if I don't get to the gym I feel guilty. And that's a good thing, so I guess that's changed. And it's not the money cause my gym's only \$20 a month, it's not like it's a lot. Cause some people, they join and still don't go, but I feel like, different. Sometimes I feel like the gym is (pause) calling me, you know (laughs). And so I guess in that sense, because I know also that if I stop and get out of the habit of it - cause you know when you stop doing something, it's easier not to do it. It's like going to church, is what I tell people, like when you miss a Sunday it's easier to miss next Sunday's (service). You know, so you gotta keep doing stuff, cause when you stop doing, and before you know it, you're not doing it at all. So when I go on vacations I make sure they got a nice fitness place, cause I gotta make sure I get my workout on (laughs). But that helps too.

Exercising in the morning emerged as a strategy for some participants, both during the study and in the pursuits after the study; however, this relates to individual preferences and schedules. Finally, James, a non-adherer who is now physically active, discussed how goals are integral to an exercise program:

I think a lot of it, especially when working out, is goal oriented. Um, you have to be able to have some sort of goal. You have to be able to say, "Okay, I know how I felt a few years ago, and I want to feel that way or even better."

Study facilitators. The second subtheme focused on factors that facilitated participation in the Fit 4 Life study, from enrollment, to adhering to the exercise program. The most commonly cited facilitators, particularly in reference to deciding to enroll in the study, were related to health and focus on self. Most participants, both adherers and non-adherers, wanted to improve their current state of health or desired to preserve their current health status. When asked what prompted her to enroll in the Fit 4 Life study, Harriet, an adherer, stated:

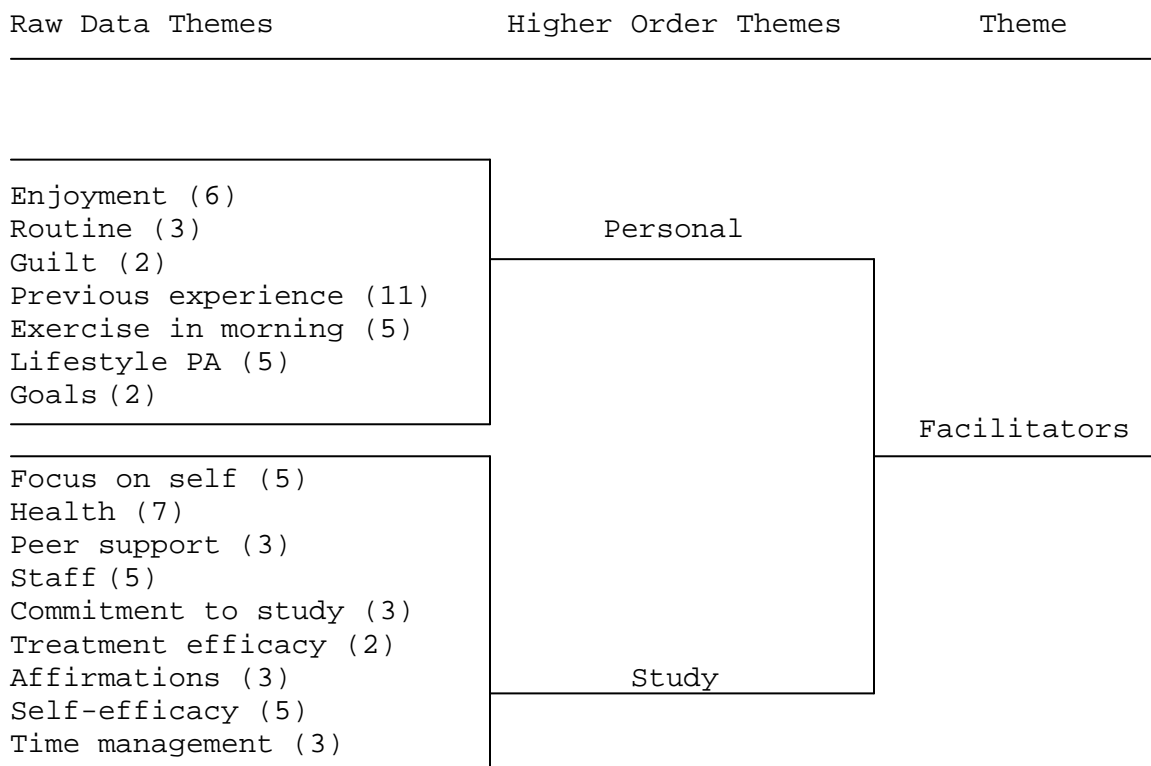


Figure 5. Participants' facilitators of exercise.

Note: Total of 16 raw data themes. Numbers in parentheses indicate number of times theme emerged as an individual idea (when greater than one).

Well you know what, I was looking at it online, um, and (pause) borderline high blood pressure. It vacillated, and then it went ahead and said, "No, no longer borderline. Let's be high." So I said, "Okay, let's try it, see what happens." And I signed up.

Geraldine, who was also an adherer, was motivated to enroll in the study because of her concern for her health, which stemmed from her loss of loved ones:

I had just had two surgeries so I had gained a lot of weight and was like, "Oh, I need to get myself together." That was the original reason, and then I was like, you know, I need to kind of focus on myself. Um, and then I went for the initial interview, but then I never did anything else. I stopped...did

nothing else. Then I got a phone call six months later (pause), yeah, about six months later and um, they asked me if I wanted to come and try again, and I was like, "Oh, yeah okay," and I really was like yeah okay when I got the call because it was so weird because my brother had just died from a heart attack. And I'd remembered all the stuff Dr. Brown had said in the initial interview, and I was like, "Yeah, this might be really good," because my mother had also died of a heart attack, and her and my brother were actually the same age. So um, I was like, "Oh, I really need to do this, just to kind of keep myself safe." So that was the biggest reason why I went back.

Donna, a non-adherer, explained her efforts to be health-conscious:

Well I thought the fact that they prescribed exercise was a great thing because I don't believe in taking drugs for anything. I don't even take like aspirin for a headache. I'll try to do something to relax. So that's what got me is that they prescribed exercise.

Another commonly cited facilitator of exercise was focusing on self; however, this facilitator was cited by adherers and not non-adherers. Geraldine stated, "Just being able to have some time for *me*, you know was a benefit." Similarly, when asked what strategies he used to help him stick with the Fit 4 Life program, Clyde stated:

Um, taking that hour a day for myself. I know there are gonna be times where I can't workout as consistently as I would like to due to the nature of my job, but at least I can make an effort to say that I'll try to make the time for myself for an hour. I owe it to myself to feel good for that hour, hour and a half.

Two commonly cited facilitators were related to the exercise environment: staff and peer support. Participants recalled how the staff members provided education and encouragement. Geraldine, an adherer, stated:

You know, just coming into an environment where I felt like folks wanted me there. You know what I mean, folks didn't mind showing up to be a part...Um, and people don't understand how important that is because when you're in an environment where you feel like people really want you to be here and appreciate you coming, that's when you come...cause I have like 4 iPods. I don't know where they are, but I would've looked for them if I didn't enjoy the staff. I would've grabbed my iPod and been like, "Listen, this is the only way I'm gonna get through it," but I didn't...So, you know, you're like, "This is a pretty cool place to come," and it is! And it almost makes you sad because it's like now you have to find somewhere else because these people aren't going to be here. So I really need to find somewhere where I can create that type of environment again.

Similarly, when Harriet, an adherer, was asked about strategies she used to stick with the Fit 4 Life exercise program, she discussed how the staff was integral in her completion of the program:

Well for one thing, we had *really* nice counselors. I enjoyed - they were a joy to work with. They encouraged you. You know, no one likes to be brow beaten...But they always encouraged you so you were able to go that extra time, "Come on, I know you can do it", an um, that's what made me stick to it.

Harriet went on to explain how she found support in her study peers. She stated:

You know, you start acting going, then you keep going, and then you become comrades with your other fellow

participants, and it becomes like, "Okay, I'm going there. Don't forget you have to go." So we encouraged each other. I had a partner.

Participants, particularly adherers, also discussed their commitment to the study and how it facilitated their participation and adherence. Sharon, an adherer, recounted:

Well, I had to get here early in the mornings, which I do anyway, come early. Maybe it meant a little bit extra because I had to drop off and do all these kind of things. But the strategies really were that somebody depended on me. And that was what kept me coming. Somebody depended on me. On days that I didn't want to come, or I wasn't really feeling well because of the back thing (injury), somebody was depending on me, so I wanted to go and put forth the effort. Um, also I knew the benefits to me, so I wanted to do it. I know what those benefits are, but I didn't put them into place until this program.

Haven recalled his commitment to the study, as well as other intrapersonal facilitators such as treatment efficacy and affirmations from others (i.e., doctors), that assisted him in completing the study:

So I preferred the morning. And I'm like a uh, competitive type people. Like, "I can do this. You ain't gonna beat me," and if I start something I'm gonna finish this thing. So that was basically it. I started it so I was gonna finish it because I wanted to see what the outcome was gonna be. You know Dr. Brown would tell us things we should look for at the end...You know, it's not supposed to be a weight loss program. Uh, just I think the competitiveness and seeing like, the weight go down. And so that showed me that it was worth it. And then I had a couple of doctor's appointments in between, and so I would meet with my doctor and we would just talk about different things.

Finally, Gwen, a non-adherer, discussed how commitment, as well as the social interaction, fueled her desire to stick with the exercise program:

...I did the exercise because I had committed myself to do this. Nobody from Broad and Montgomery drug me out of my house to do this. (laughs) So when I decide to do something, I try to do the best I can. You know, you see the people, you get to talking and it makes the time fly.

Participants also described how treatment efficacy, along with self-efficacy, facilitated participation.

Harriet, an adherer, stated, "I came back to see what I could do. To see if I could do it. To see if it would really work." Self-efficacy is also a benefit of exercise. (See Figure 4.)

Theme 4 - African American

The final theme that emerged - African American - focused on the unique cultural characteristics, as well as the perceived culturally specific barriers to exercise and physical activity, and strategies for navigating these barriers. Results related to this theme may only be representative of African Americans in a large urban area in the Atlantic region of the United States. A diagram outlining the raw data themes and subthemes related to the African American theme may be found in Figure 6.

Cultural characteristics. The first subtheme related to the African American theme focused on the characteristics participants perceived to be unique to African Americans. When asked what characteristics they believed made their culture unique, participants cited resiliency/perseverance most frequently. Haven stated:

...You know, I believe it would be endurance, perseverance, and that's the strongest thing (pause) survival skills. You know, because they talk about how the economy is this, and things are happening, but yet, we've survived. You know, we've learned to go further - to go on, with limited resources. You know, so I guess it would be our perseverance.

Similarly, Sharon affirmed:

I think we have great resiliency. Uh, and not just African Americans, but I think people of color in general have a resiliency that - and I'm not saying that eastern Europeans or anything like that don't, but I just don't see a resiliency and a joy for life, and the perspective of, "This is what was given to me, this is what I was dealt so I'm not going to dwell on all the negative."

Two other commonly cited cultural characteristics were racial pride and being under scrutiny. When asked what being African American meant to him, Clyde stated:

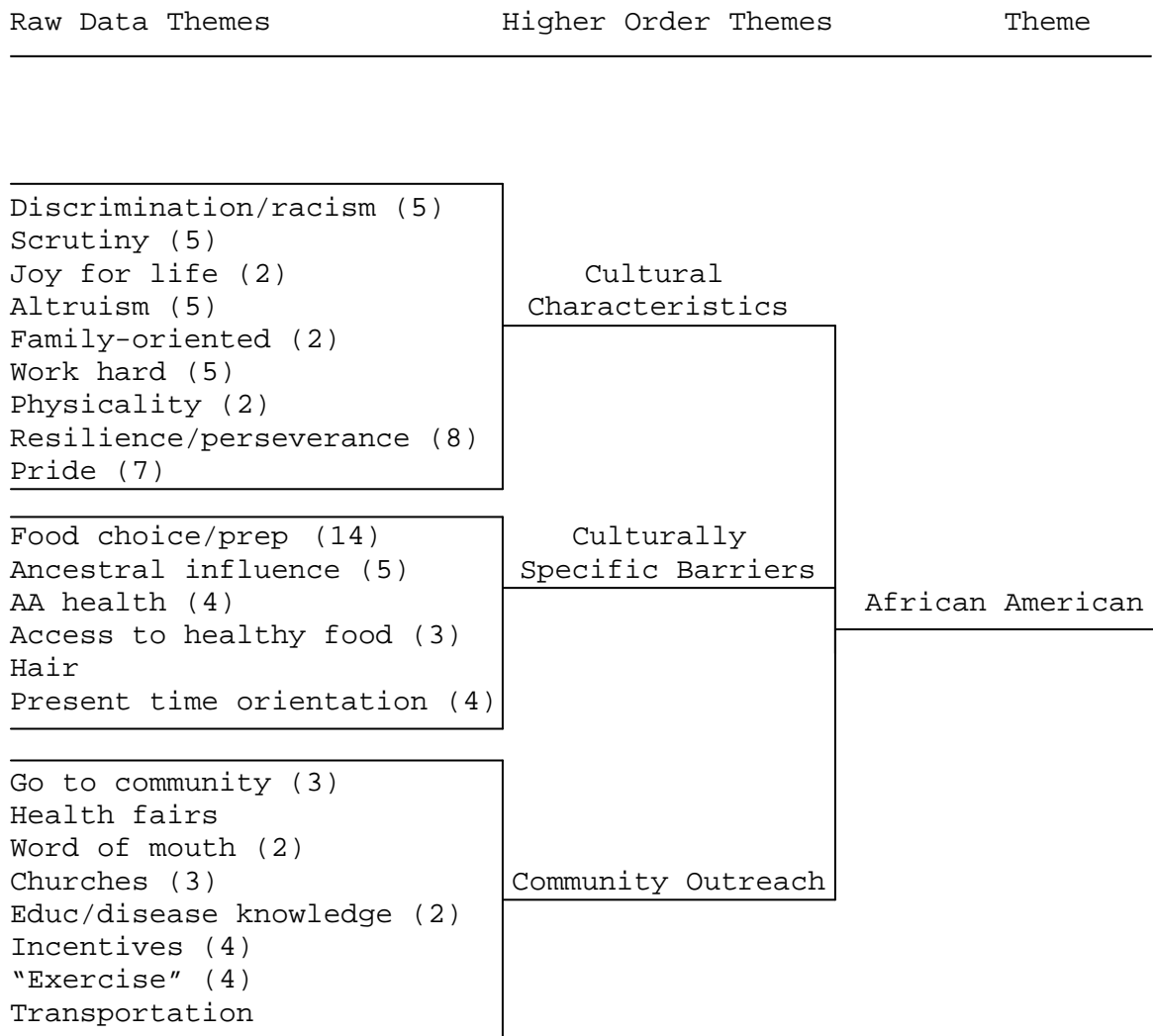


Figure 6. Participants' perception of being African American.

Note: Total of 23 raw data themes. Numbers in parentheses indicate number of times theme emerged as an individual idea (when greater than one).

AA = African American

It means I feel - I'm proud of my heritage...Just through some of the racism I've endured in my life, I felt it was unnecessary, but I endured it...As much as people want to say racism is not here, it's very much here. As a black man it's like you're walking on a tight rope, you know, you can't do as much as other races do. You can't act out in certain ways that other races do because you're under a microscope.

People look at you and have perceptions of you, and some of the perceptions are you know, negative, and those who have that negative perception of black men, they're looking for you to do something to attribute to their reasoning of not liking you.

Donna shared similar thoughts regarding racial pride and facing scrutiny:

Um, it means, uh (pause) all of what I am. I am proud to be African American. It's the way I think, okay, the way I - I'm sure - feel, in that other nationalities can come into a room and people may try to figure out what they are, or respect them in a different way. Um, for an African American woman to walk into a room, in my opinion, the room takes a different air or something, okay?

When reflecting on what being African American meant to them and ways in which they felt their culture was unique, participants also made references to being hard working. Working hard wasn't described in terms of an innate attribute of African Americans; rather, working hard was described as stemming from a need to work harder than others in order to achieve equality, as a result of systematic discrimination. Sharon explained:

...Just living life is harder. Getting a promotion is harder, um, advancing in your career is harder, um everything is just harder. And you always have to prove yourself...(being African American) is a challenge you live with everyday. It's not something you consciously think about all the time, you just, you just deal with it.

Geraldine described working hard in a similar manner. When asked what being African American meant to her she stated:

...you know what it means to me is struggle, unequal, you know, most time looked at different, looked at as "they can entertain us, but challenge us" education-wise, um, had to be better always, had to do more than others, proud, you know, always proud. At a disadvantage.

Participants also mentioned attributes such as being physical, family-oriented, and having a joy for life.

Throughout the interviews, participants spoke about others with genuine concern, and this concern for others appeared to influence some interviewees' reasons for participating in the Fit 4 Life study. Pam stated, "...I felt like I would be helping, if accepted, to help those who want to do research, those who want to encourage and promote health-consciousness among people of color. So I felt like I was helping and assisting in that arena." This value was also underscored when Geraldine cited, "be willing to give back," as a characteristic that makes her culture unique.

Culturally specific barriers. The second subtheme related to the African American theme related to the barriers that may be unique to members of the African American community. Participants believed that food was the biggest detriment to adopting and maintaining a healthy lifestyle. When asked, "In what ways does your culture facilitate your being healthy", Haven, an adherer,

responded, "Healthy? Well it's definitely not the food (laughs)." This was a typical reaction for both adherers and non-adherers. When participants were asked to describe the ways in which culture hinders them being healthy, each of the participants discussed how unhealthy eating is prevalent in the African American community. Haven discussed how both "soul food" and fast food are barriers, along with issues related to accessibility of foods:

We're heavy on the salt, heavy on the starches, the rice and stuff like that, you know. Macaroni and cheese, basically stuff that's not really healthy for us, but it's that soul food stuff. Fried food, fried chicken (laughs). Don't nobody wanna eat no salad and stuff like that. And so I think that's - and also too I guess it's a big thing too, is the fast food thing. They got so many in the neighborhood, everybody's running to get that fast food, McDonald's and stuff like that. That quick stuff. And some stuff too I believe, is cost of - financial problems. You may can't be the best of foods. You can't go to Whole Foods and get this and get that. You have to go to another store where they sell processed foods and things of that sort.

Harriet, an adherer, reflected on what she learned during her time enrolled in the Fit 4 Life study. She discussed food choice and preparation, but also highlighted how making healthy choices is a constant struggle:

We eat way too much salt. Way too much salt. I mean, she (the dietician) really - oh she would kill me, but since I've been injured, I've been grabbing my chips. We do, we eat way too much salt. Sodium is - is a killer. Only because I know it for myself, that's what I need to get rid of. Cooking, you know. She helped us to learn about trans fats...I'd never looked

at trans fat. You go in there, you get your oil, throw it in, fry your chicken up. Trans fat...Yeah, those are two major things I've picked up. And it's weird because my father is 81 years old. I can cook him something and he will turn around and put more salt on it. My father eats tons of salt. He loves it. My granddaughter, we all like salt, hot sauce, the more the better. Horseradish, hot mustard all of that. That's us. So I don't understand why we're sensitive to sodium because that's all we eat!

Participants also communicated a notable relationship among ancestral influence, another common culturally specific barrier, and food choice and preparation. Pam stated:

...Looking back at yester years and looking at what those before us had to eat because of what was available to them, which was not at the top of the (pause) food like, and the god forsaken pig's feet and ribs. How you could even look at that stuff? And even - I feel that part of our culture is truly, even today, a demise to our health.

James also discussed the role of ancestral influence on eating habits:

...I can only speak for myself, but when you ate, you basically had to eat the whole plate because there wasn't an abundance, in a sense and so forth. And did we take into consideration what we were eating? And that's a bigger difference, that, and then you take it into your next phase of life and with your own children, and you say, "Make sure you eat everything on the plate", but what are you giving them that they're eating?

He went on to explain how both food and lack of education are cultural barriers to health and exercise:

...As far as African Americans are concerned, one of the biggest barriers is, "What my parents did; what my

grandparents did," and a lot of it is that, you can only speculate and they're only gonna tell you the good times anyway. And sometimes the bad time - it's like - okay, I'll give you a for instance. Uh, my parents ate pork and they did this, and their bodies were okay. Your grandparents. But your grandparents worked so much longer during the day. They relaxed so much less than we do. You know, so much less. So the body was in motion 75% of the day. Today, "Well my grandparents" (leans back and motions like he's pressing a television remote) "so I'm gonna be okay." But that's not the reality of the point of reference.

Similarly, Donna candidly stated:

...We're not conscious eaters. "Well my momma ate it, so I'm gonna eat it." You know? So you've got history against you as far as changing the way people eat. What does your momma eating pork got to do with you eating pork? But I don't think they're adverse to learning.

Another community-level barrier participants cited related to having a present time orientation. While a present time orientation has been purported to be an attribute prevalent in African American populations (Kreuter et al., 2003), it can be a barrier to exercise participation, as well as other health behaviors. Exercise, like other many other health behaviors, yields few immediate benefits; therefore, individuals may not see the "relationship between present actions and future events" (Kreuter et al., 2003, p. 142).

When discussing what barriers to exercise he believed people experienced, Clyde's job as a social worker provided him with unique insight:

You know, they don't think about exercise. They don't think about certain things, they just have their mind on "survival mode." They're just trying to deal with what's going on today, they don't focus on what's happening tomorrow. Just survival mode - they can't think too far ahead...They're just trying to survive day-to-day.

When asked what she believed some of the barriers people experience regarding exercise, Pam, a non-adherer, stated, "I don't think we're really conscious in general, really health-conscious and exercise conscious. I don't think, um, we're really on top of that...we just focus on the here and now." One could argue that focusing on the "here and now" causes one to be unmotivated to engage in health behaviors in which the benefits are not realized immediately (e.g., exercise).

Community outreach. The final subtheme related to the African American theme focused on considerations for fostering exercise and physical activity participation in the community. Participants recommended several strategies for reaching African Americans, such as going into the community via community centers and organizations, attending local health fairs, and churches. Participants also believed that there needed to be more education regarding exercise and disease. One of the commonly cited considerations was in reference to the word "exercise."

Participants, particularly non-adherers, believed that the word "exercise" alienates some individuals. Gwen stated:

Well you know what; a lot of times when you say "exercise" a lot of people are turned off right there. So if you're one of those people, you're never gonna find anything you like to do because you're never gonna give it a shot.

Donna also felt the term "exercise" hindered people from being physically active:

...A lot of people in the African American community do line dancing, which is good, and older people do it. And it's exercise. But you know, they'll jam on (dances in chair) and won't nobody complain about sweatin then. But it's good for them, but they're not thinking, "I'm exercising." You're calling it some clever name. So it's kind of tricks of the trade.

Finally, regarding community outreach, James summarized it profoundly:

It's the creativity that allows you to move forward. You know people because you know yourself. How would you like information applied to you? What would you accept as someone trying to help? What would you accept over something your parents have told you...I think that the greatest understanding of it is that you're not going to reach everybody, but if you can reach *some*. Then that's very, very important.

Results for Secondary Aim

The purpose of the secondary aim was to determine follow-up behaviors of participants previously enrolled in the Fit 4 Life study.

Results for Research Question 3

Is there a significant difference between exercise behavior (stage of change) at follow-up between adherers and non-adherers? A chi-square analysis was used to determine if there was a significant difference between adherers' and non-adherers' current exercise behavior.

Differences in Participant Exercise Behavior at Follow-Up. A chi-square analysis was conducted to analyze participants' exercise behavior at follow-up ($N = 44$), using the stage of change construct. No participants reported being in the precontemplation stage. The analysis revealed no statistically significant difference in current exercise behavior between adherers and non-adherers ($\chi^2(3) = 1.099, p = 0.924$). Summary data on participants' stage of change at follow-up and analysis are contained in Table 14. Table 15

Stage of Change Comparison for Adherers and Non-Adherers

Stage of Change	Adherer n=26		Non-Adherer n=18		Total N=44		Chi-square Test	
	n	%	n	%	N	%	χ^2	sig.
Precontemplation	0	0	0	0	0	0		
Contemplation	3	11.5	2	11.1	5	11.4		
Preparation	5	19.2	4	22.2	9	20.5	1.099	0.924
Action	4	15.4	1	5.6	5	11.4		
Maintenance	14	53.8	11	61.1	25	56.8		

Discussion of Research Questions

Specific Aim 1

RQ1.1. The first research sub-question sought to explore demographic differences among adherers and non-adherers in the Fit 4 Life study. On average, Fit 4 Life participants were educated (with more than 60% of those who responded having at least a Bachelor's degree) and the most commonly cited household income was \$50,000 - \$75,000 annually. There were no significant differences in level of education and income among groups, both of which are correlated to exercise adherence. The lack of variation among adherers and non-adherers could be attributed to the fact that the overall sample's level of education and household income were positively skewed. (See Figures 3 and 4.) Non-adherers did, however, live in larger households than adherers, with households as large as seven members. This is particularly interesting, given that 85% of the participants in this study were women. Women in this study may have experienced greater demands related to caring for members in their household. Lack of childcare (Siddiqi, Tiro, & Shuval, 2011) and family responsibilities are commonly cited barriers to physical activity among

African American women (Banks-Wallace, 2002; Siddiqi, Tiro, & Shuval, 2011).

Exploring demographic differences between adherers and non-adherers also revealed that non-adherers in this study were more likely to be employed part-time than adherers (see Figure 5). Literature has explored the relationship between employment and adherence to exercise. Izquierdi-Porrera and colleagues (2002) found that employment was negatively associated with exercise adherence among a group of African American women; however, they did not differentiate between full- or part-time employment. Courneya et al. (2004) found that full-time employment was negatively associated with exercise adherence among colorectal cancer survivors. It is important to note that in both of these studies, employment was assessed as a dichotomous variable (employed vs. unemployed and employed full-time vs. not employed full-time, respectively). Participants in this study who were employed part-time may have experienced a number of barriers in regard to their employment status. Individuals who work part-time may not have as much free time as retired or unemployed individuals, may have varying schedules, which could make attending scheduled exercise sessions difficult, and may face stressors such as the demands of work or looking for

full-time employment. One should note, however, that although there was a difference in employment status among groups, there was no significant difference in annual household income. There were also no significant differences in regards to gender, education, and marital status.

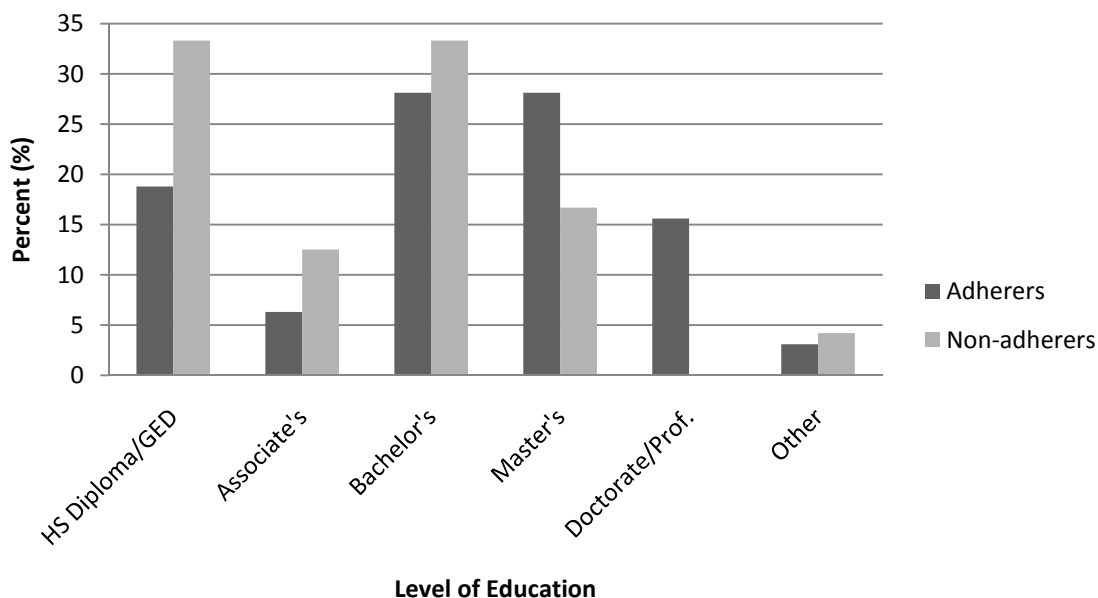


Figure 7. Highest level of education obtained among adherers and non-adherers (N = 56).

RQ1.2. The second research sub-question sought to compare psychosocial characteristics among Fit 4 Life adherers and non-adherers. There were no significant differences in total scores for the Exercise Benefits and Barriers Scale (EBBS) or the EBBS benefits subscale; however, non-adherers scored significantly lower than adherers on the barriers subscale, indicating greater

perceived barriers to exercise. The top barrier statements associated with high agreement by non-adherers were: exercise tires me (2.71), exercise is hard work for me (2.58), and my spouse doesn't encourage me to exercise (2.65). The top barrier statements for adherers were: exercise tires me (2.81), I feel fatigued by exercise (2.84), and exercise is hard work for me (2.97). Non-adherers had significantly lower scores than adherers on two barrier items: exercise tires me (2.17 compared to 2.81) and my family doesn't encourage me to exercise (2.67 compared to 3.22), indicating that non-adherers perceived these to be greater barriers.

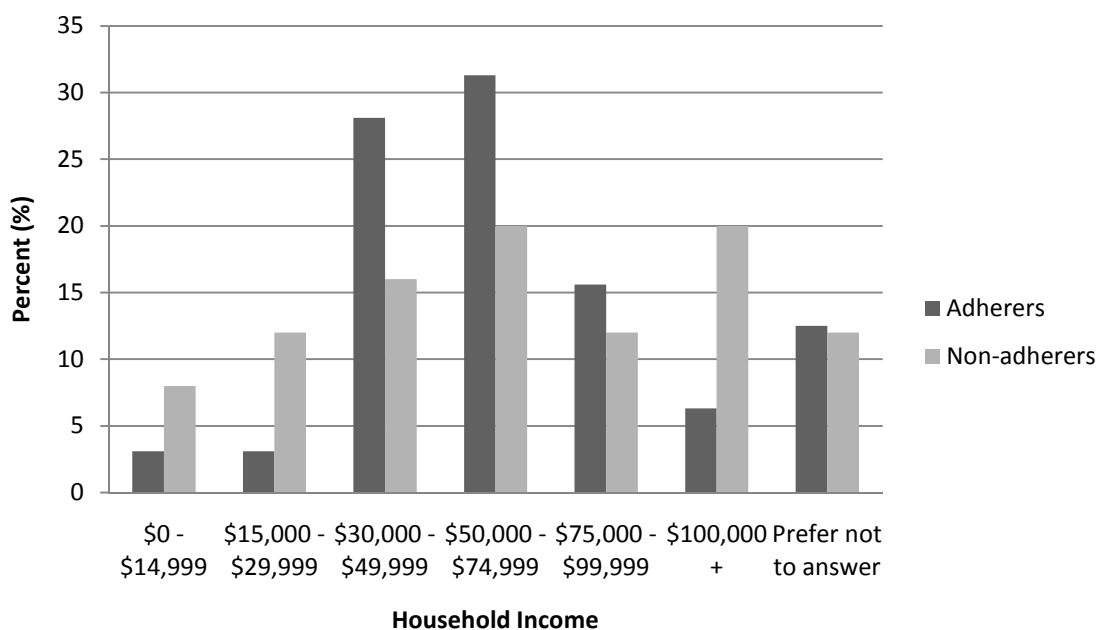


Figure 8. Household income for Fit 4 Life participants (N = 57).

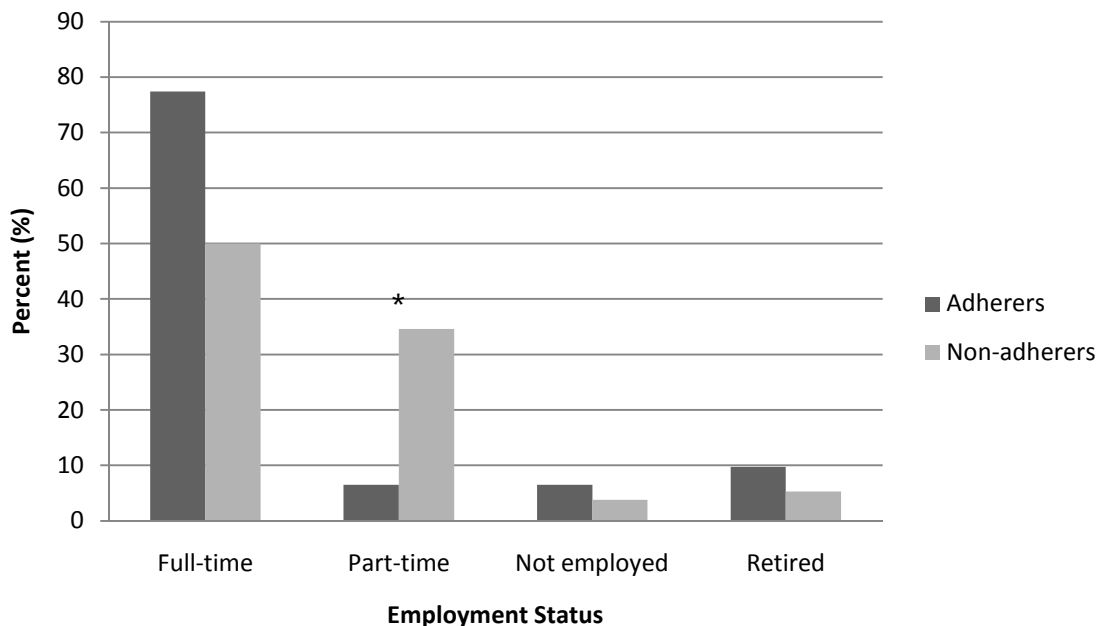


Figure 9. Employment status for Fit 4 Life participants (N = 57).

Note: * significant at $p < .05$

For both groups, the most salient perceived barriers were related to negative evaluation in response to the physical sensations of exercise (e.g., exercise being hard work). Non-adherers perceived little spousal support for exercise.

As previously stated, there were no significant differences in total scores for the Exercise Benefits and Barriers Scale (EBBS) or the EBBS benefits subscale. This brings into question the utility of the EBBS for differentiating between those who adhere to exercise programs and those who do not. The EBBS may, however, be useful for differentiating between adherers' and non-adherers' perceived barriers to exercise. The ability of

the EBBS to unveil significant differences among adherers and non-adherers in this study may indicate that participants in the study were aware of benefits of exercise, but barriers may have been more salient to them. The usefulness of the EBBS in differentiating between these two groups (i.e., adherers and non-adherers) warrants further inquiry.

Adherers' and non-adherers' total and item scores for the Barriers Self-Efficacy Scale (BARSE) were not significantly different. Both groups' highest scores were in response to the items, "the weather was very bad" (72.19 and 74.21, respectively) and "I had to exercise alone" (71.56 and 75.79, respectively), indicating they had most confidence in their ability to exercise despite these barriers. Adherers' lowest scores on the items, "I felt pain or discomfort when exercising" and "I was not interested in the activity" (39.06 and 47.50, respectively), indicated they were least confident in their ability to exercise given these barriers. Non-adherers' were least confident in their ability to exercise if "my schedule conflicted with my exercise session" and "I was not interested in the activity" (41.58 and 46.11, respectively). Adherers' total BARSE scores were only

slightly higher than non-adherers (58.56 compared to 56.43).

An individual's level of self-efficacy is based upon four sources of information: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal, with performance accomplishments being the most salient (Bandura, 1977). Participants were most efficacious in situations where the weather was bad or they had to exercise alone; therefore, one could then infer that participants' confidence in their abilities may be based on their previous experiences in which they successfully exercised under those conditions. Similarly, participants' low self-efficacy for exercise amid other barriers (e.g., experiencing discomfort or not being interested in the activity) may reflect previous unsuccessful attempts to exercise given those conditions, or lack of experience encountering those particular barriers. Further, both groups' low self-efficacy scores for the item, "I was not interested in the activity" underscores the importance of enjoyment in the role of exercise participation. Based upon this notion, it is possible that adherers in this study enjoyed the aerobic exercise training more than non-adherers.

There were no significant differences in adherers' and non-adherers' subscale scores for the Multidimensional Health Locus of Control (MHLC) scale. Both adherers and non-adherers had high scores for the internal subscale (25.67 and 25.50, respectively), indicating they perceived themselves to be responsible for their own health. Participants had lower scores on the external subscales (i.e., chance, doctors, and other people), indicating they believed their health to be influenced by external factors to a lesser extent.

Based upon previous research, one may expect adherers to have higher internality scores, and lower externality scores than non-adherers (Hassmen, Koivula, & Uutela, 2000; Wallston, 1991, 1992), meaning adherers would consider themselves to be in control of their own health more than non-adherers. Results, however, suggest that there is no relationship between health locus of control and exercise adherence within this sample.

A possible explanation for both adherers and non-adherers scoring high on the internal subscale may be that participants have differing views of health behaviors. For example, some participants may believe exercise to greatly influence health, whereas others may believe other health

behaviors (e.g., diet or medication adherence) are more important for eliciting positive health outcomes.

The homogeneity of scores among groups may also be due to the fact that this study is exploring a single health behavior (i.e., exercise). Wallston (2005) suggests that the MHLIC subscales may be more effective when examining an index of behaviors, rather than only one. Finally, it is important to acknowledge other psychosocial factors, such as self-efficacy, operate in conjunction with locus of control, to influence health behaviors (Wallston, 2005).

The final psychosocial instrument used in this study was the Satisfaction with Life Scale (SLS) (Deiner et al., 1985). Life satisfaction, an important component of subjective well-being, refers to one's global assessment of one's life as a whole (Deiner et al., 1985). Adherers scored significantly higher than non-adherers on four of the five items, as well as total SLS score. These results mirror results found in other studies (Grant, Wardle, & Steptoe, 2009; Jennen & Uhlenbruck, 2004; Stubbe et al., 2007). Grant and colleagues (2009) found a positive relationship between life satisfaction and several health-promoting behaviors, including regular exercise participation. Further, the researchers concluded that the relationship between life satisfaction and the perceived

health benefits of the behavior were independent of each other (Grant, Wardle, & Steptoe, 2009). Additionally, Jennen and Uhlenbruck (2004) found that life satisfaction and frequency of exercise are positively correlated.

Adherers in this study may have had greater life satisfaction for several reasons. First, exercise yields numerous mental health benefits, such as improved mood states and cognitive function, reduced symptoms of depression and anxiety, and increased self-esteem (Colcombe & Kramer, 2003; Courneya et al., 2003; Fox, 2000; Lautenschlager et al., 2008; Paluska & Schwenk, 2000). Improvements in these areas, as well as marked changes in physiological outcomes, can all influence one's cognitive appraisal of one's well-being.

To that end, another plausible explanation for differences in life satisfaction may be that adherers believe that they are improving their health by exercising regularly. Research shows that there is a positive correlation between life satisfaction and self-rated health (Siahpush, Spittal, & Singh, 2008). Finally, Stubbe and colleagues (2007) concluded that "underlying factors," such as environmental influences or genetic factors, may influence both exercise participation and life satisfaction.

RQ1.3. Due to the nature of the Fit 4 Life study, prospective participants had to meet rigorous criteria in regard to physiological characteristics. To that end, there were few physiological characteristics that differed significantly among adherers and non-adherers. On average, Fit 4 Life participants had normal fasting glucose levels, desirable levels of total cholesterol, normal triglyceride levels, high HDL, and near or above optimal levels of LDL. While these measures yielded satisfactory results, participants' mean body fat percentage was over 42%, which is indicative of obesity, and participants had below average aerobic capacities, as indicated by VO_2 peak and regression values.

There were no significant differences in the aforementioned characteristics; however, the results of the analyses exploring differences related to the participants' physiological characteristics revealed that adherers had significantly lower diastolic blood pressures during the dietary stabilization period and at baseline. According to the JNC7 (2004) classifications, both adherers' and non-adherers' mean blood pressures fall into the prehypertensive category when taking systolic pressure into account. When looking at diastolic blood pressure alone, the mean baseline pressure (79.07 mmHg) is considered to be

in the normal range; however, one must take into account both systolic and diastolic pressures when evaluating hypertension status and associated risks.

Non-adherers weighed more than, and had significantly greater BMIs than, adherers. Similarly, non-adherers had significantly greater RMRs and greater fat mass (FM) than adherers. These measures (i.e., weight, BMI, RMR, and FM) are interrelated. Participants' heights did not differ significantly based upon adherence classification; however, there was a significant difference in weight. This difference in weight accounts for the variance in BMI among groups. Although adherers had significantly lower BMIs than non-adherers at baseline, the mean values for both groups correspond to an obese classification, according to the World Health Organization (WHO, 2012). The difference in resting metabolic rates (RMR) may be partially attributed to the variance in fat mass (FM); however, literature suggests that fat free mass (FFM) may account for greater variance in metabolic rate (Johnstone, Murison, Duncan, Rance, & Speakman, 2005). There were no significant differences in other physiological variables among adherers and non-adherers.

Specific Aim 2

The second aim sought to explore roles of culture and social context in the process of exercise behavior change for participants in the Fit 4 Life study.

RQ2.1. The first research sub-question sought to explore the barriers to exercise among adherers and non-adherers. This sub-question was informed by the theme *barriers*. Each of the participants stated that their friends and family were sedentary, making it perhaps the most notable barrier to exercise identified by this group. Research has consistently demonstrated a positive relationship between exercise adherence and friend/peer social support and spouse/family social support (Resnick, Orwing, Magaziner, & Wynne, 2002; Trost et al., 2002; Weinberg & Gould, 2010). Friends and family members may provide social support for exercise in many ways, such as modeling exercise or exercising with the individuals, providing them with information related to health and exercise, asking the individuals if they've exercised, or providing verbal encouragement. Resnick and colleagues (2002) concluded that friend support may have a stronger influence on older adults' exercise behavior than family or expert social support. Further, social support has been identified as a prime enabling factor for the initiation

and maintenance of exercise among African American men and women (Siddiqi, Tiro, & Shuval, 2011). Participants' friends and families in this study were sedentary and therefore did not provide any instrumental support (e.g., modeling the behavior); however, it is possible they provided support in other ways. It is important to note, however, participants' accounts of wanting to find friends who are physically active and/or having to go outside of their social circle. Given the positive relationship between social support and adherence to exercise, one may infer that lack of social support for exercise could be detrimental to adherence. Interestingly, both adherers and non-adherers did not seem to recognize sedentary friends and family as a barrier; rather, they seemed to have adopted a "that's just the way it is" type of attitude. A possible explanation may be that participants in this study accepted their lack of social support and over time, ascribed less importance to social support for exercise. Further, as previously mentioned, adherers may have found other sources of support (e.g., made new friends). The importance ascribed to social support within this population warrants further investigation.

During the interviews, participants were asked to identify barriers to exercise. After analysis of the

transcripts, barriers were divided into personal, community, and study barriers. A commonly cited personal barrier - job demands - was cited more frequently by adherers than non-adherers. This suggests that work may not have been a salient barrier, or adherers effectively developed strategies to balance work and exercise (e.g., time management). Finally, some adherers conveyed that exercise provided a means to alleviate work stress, which may have facilitated their adherence to exercise during the study.

Another personal barrier cited more frequently by adherers was caregiving. Previous literature on social context factors influencing exercise participation has found that African American women place great importance on being the caregiver in the family, taking care of both younger and older generations (Harley et al., 2009). Female adherers in this study elicited social support (e.g., co-workers watching grandchild) and acknowledged the need to take time to care for themselves. Also, both men who were adherers and non-adherers discussed how family hindered exercise participation. Fulfilling the role as being the provider for the family has been found among similar populations (Griffith, Gunter, & Allen, 2011).

Another personal barrier - lack of motivation - was only cited by non-adherers in this study. Previous research has consistently demonstrated a positive correlation between self-motivation for exercise and adherence (Troost et al., 2002; Weinberg & Gould, 2010).

Adherers and non-adherers shared several perceived community barriers to exercise. The most commonly cited community barrier was knowledge/expectations, followed by time and motivation. There seemed to be a consensus that lack of education is a primary deterrent to persons being physically active; however, there is no significant relationship between exercise/health knowledge and exercise adherence (Troost et al., 2002; Weinberg & Gould, 2010). There is, however, a strong negative relationship between adherence to exercise and perceived lack of time (Troost et al., 2002; Weinberg & Gould, 2010). Participants in this study agreed that perceived lack of time was a common barrier to exercise, and both adherers and non-adherers who were currently active acknowledged that time was formerly a barrier for them, but they managed to find time to devote to exercise.

It is logical that adherers and non-adherers would possess similar perceptions regarding community barriers, but convey more differences among personal and study

barriers. The most commonly cited barrier to the Fit 4 Life exercise program was lack of time/convenience. This barrier was cited more by non-adherers than adherers. Time/convenience may have been a significant barrier, particularly to non-adherers, due to the limited hours during which the fitness center was staffed (i.e., 2-5 hours a day, six days a week) and participants' competing schedules. Additionally, adherers may have had more flexible work hours or been more willing to rearrange their schedules around exercise training than non-adherers, indicating it was of greater priority.

Both adherers and non-adherers believed that the exercise prescription itself was a barrier. Some participants explained that the prescription required them to exercise at a heart rate that was not challenging for them, which evoked feelings of boredom; however, adherers expressed that they were later able to exercise at more challenging rates as they progressed through the program. Other participants, both adherers and non-adherers, did not indicate that the exercise prescription was a barrier to exercise, which highlights individual differences in perceived effort. Previous research has suggested that sedentary individuals are more likely to adhere to exercise prescribed at moderate intensities (i.e., 45-55% VO_2 max)

than higher intensities (i.e., 65-75 VO₂ max) (Perri et al., 2002); however, the prescription used in this study began at a moderate intensity (i.e., 50% VO₂ max), then incrementally increased to 75%.

RQ2.2. The second research sub-question sought to explore the facilitators to exercise among adherers and non-adherers. This sub-question was informed by the themes *benefits* and *facilitators*. *Benefits* focused on the cognitive/mental and physical benefits participants believed to result from engaging in regular exercise, whereas *facilitators* centered on the factors they believed to encourage participation. Participants were asked to identify short- and long-term benefits of exercise; however, the majority of references to these benefits emerged throughout their interviews and not in response to those specific questions. This may indicate that participants in this study may not be cognizant of the numerous benefits of exercise. This may be particularly true for cognitive/mental benefits. Adherers acknowledged the cognitive/mental benefits of exercise more frequently than non-adherers; however, both groups cited more physical than mental benefits. The most commonly cited cognitive/mental benefit of exercise was self-efficacy, although participants did not refer to it as such. Rather,

participants described self-efficacy in terms of being impressed with what they could do, learning to use equipment, etc. Self-efficacy is one of the strongest determinants of exercise adherence (Troost et al., 2002). Finally, self-efficacy emerged as an individual idea significantly more frequently during adherers' interviews, than non-adherers'. It is possible that non-adherers did not have the same experiences of self-efficacy due to the fact that they didn't adhere to the exercise program.

Both adherers and non-adherers identified more physical benefits of exercise than cognitive/mental benefits. One of the most commonly cited physical benefits was controlling blood pressure. This was anticipated given the purpose of the Fit 4 Life study; however, adherers referenced blood pressure significantly more times than non-adherers. A possible explanation is that adherers may have experienced changes in their blood pressure during the time they were enrolled in the exercise portion of the study. They may have also received more education related to the topic as a result of their regular attendance at the staffed exercise sessions.

Adherers also cited weight loss as an exercise benefit more than non-adherers. This is interesting due to the fact that the Fit 4 Life study was not a weight loss study;

however, weight loss is perhaps the most well-known benefit of, and motive to, being physically active. Benefits such as aiding in the management of diabetes, cholesterol, and cancer were less frequently cited (although cited more by adherers), suggesting that participants may have been less aware of the role of exercise in the treatment and attenuation of these chronic conditions.

Being aware of the various benefits of exercise may facilitate exercise behavior; however, several other personal and environmental factors can facilitate exercise adherence. Previous adult physical activity experience is a positive determinant of exercise adherence (Troost et al., 2002); however, both adherers and non-adherers in this study indicated they had been previously physically active. Interestingly, goal setting was only discussed twice throughout the interviews. Further, other useful behavioral self-management skills, such as rewarding oneself and imagery, were not mentioned.

Both adherers and non-adherers expressed concern for their health or a desire to maintain their health as a reason for enrolling in the Fit 4 Life study. This desire may have made participants initiate exercise; however, it did not appear to facilitate maintenance of the program. According to the health belief model, individuals will

likely adopt a behavior (e.g., exercise) if they believe engaging in the behavior will reduce their susceptibility and severity of illness, and believe the benefits of engaging in the behavior outweigh the barriers (Rosentock, 1990; Woodard & Barry, 2001). In this study, non-adherers perceived more barriers to exercise than adherers; therefore, their desire alone to improve their health may not have been enough to motivate them to persist in the behavior.

Another facilitator of exercise in regard to the study was the staff. Adherers identified the support of the staff more frequently than non-adherers. Social support from exercise staff/instructors, as well as leader qualities, is strongly correlated to exercise adherence (Trost et al., 2002; Weinberg & Gould, 2010). Staff support may not have been as salient a facilitator of exercise among non-adherers. Rather, non-adherers' perceived barriers may have resonated more. Finally, a chief facilitator of exercise among adherers was the opportunity to focus on themselves. Adherers viewed focusing on themselves as both a benefit of exercise, as well as a strategy to stick with their program. This was not a facilitator for non-adherers, which highlights the potential significance of this theme. Finally, another

notable facilitator of exercise that emerged during interviews was efficacy expectations. Self-efficacy was a facilitator of exercise in this study among adherers; however, treatment efficacy was also cited by adherers. Expectations regarding the health benefits of exercise are additional positive determinants of exercise adherence (Trost et al., 2002; Weinberg & Gould, 2010).

RQ2.3. The third research sub-question sought to explore how cultural factors influence decisions related to exercise behavior. This sub-question was primarily informed by the theme *African American*. This theme focused on the cultural characteristics, as well as culturally specific barriers to exercise. Participants in this study identified several characteristics that they believed made their culture unique. Among these were resilience/perseverance, pride, hard-working, and facing discrimination/racism. Understanding cultural characteristics is paramount because it provides a framework through which to develop effective interventions (Kreuter et al., 2002; Siddiqi, Tiro, & Shuval, 2011). Further, previous literature has suggested there is an association between health behaviors and cultural beliefs and constructs (Kreuter et al., 2002; Lukwago et al., 2001). Participants in this study discussed two cultural

constructs that have been demonstrated to influence African Americans' health practices: pride and present time orientation. Time orientation may particularly influence exercise behavior because most exercise benefits are not immediately realized; therefore, individuals may be less likely to maintain an exercise program when they won't reap any benefits in the foreseeable future. Participants believed that individuals, particularly African Americans, may tend to focus on what appears to require immediate attention, and may ascribe lesser importance to behaviors that result in long-term benefits (e.g., exercise).

The most commonly cited culturally specific barrier was food choice and preparation. Both adherers and non-adherers mentioned unhealthy eating as an integral part of African American culture. Participants also acknowledged the role historical and ancestral influences have had on food choice and preparation among African Americans. Research has not established a consistent relationship between diet and exercise adherence (Troost et al., 2002; Weinberg & Gould, 2010); however, given the perceived importance of this barrier among participants, it may be an important component of any intervention effectively addressing exercise behavior among African American populations. Further, participants believed that eating

better was a benefit of exercise, highlighting the significance of the relationship between diet and exercise.

Secondary Aim

The secondary aim sought to examine differences in adherers' and non-adherers' current exercise behaviors, using the stage of change construct. The results revealed that there were no significant differences between groups. No participants reported being in the precontemplation stage, but participants indicated being in each of the remaining four stages. Fourteen of the 44 respondents, both adherers and non-adherers, reported being in the contemplation and preparation stages. This indicates that they are not currently physically active; however, they intend to begin exercising within the 6 months or next month, respectively. The majority of respondents reported being physically active by indicating they were in the action or maintenance stages. Interestingly, 61.1% of non-adherers compared to 53.8% of adherers reported being in the maintenance stage, which means they have been physically active for more than 6 months. These results were unexpected based upon previous adherence literature (Buckworth & Dishman, 2002; Courneya et al., 1997; Dishman, 2001); however, there are several possible explanations for the above findings.

One of the limitations of conducting self-report research is the possibility that participants may not answer questions correctly or truthfully. Participants were asked to indicate whether or not they exercise according to the following definition:

Regular exercise is any *planned* physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed 3 to 5 *times* per week for 20-60 *minutes* per session.

Exercise does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat.

It is possible that respondents did not understand this definition of exercise, or did not respond truthfully.

A second possible explanation relates to the definition of exercise used in the Exercise Stages of Change - Short Form. The Fit 4 Life study utilized a specific exercise prescription which required participants to exercise 40 minutes at 65% of their VO_2max . It is possible to meet the criterion for exercise (according to the Exercise Stages of Change - Short Form) yet not meet the requirements for the Fit 4 Life exercise program. For example, an individual exercising three times a week for 30

minutes each session may meet the criterion for exercise according to the aforementioned definition; however, he or she would not be in accordance with Fit 4 Life guidelines.

Another plausible explanation for a greater percentage of non-adherers being in the maintenance stage of the transtheoretical model is that they may have not have liked aspects of the exercise program prescribed to them in the Fit 4 Life study (e.g., intensity, mode, staff, location). It is possible that respondents who did not adhere to the Fit 4 Life program, as well as those who did adhere, may have found activities that they find more enjoyable. New exercise programs, such as Zumba, have emerged in an effort to appeal to individuals who may not enjoy "traditional" exercise. Further, non-adherence in the Fit 4 Life study may reflect the fact that it was a structured exercise program, and not lifestyle physical activity (Marcus et al., 2000), such as walking the dog or mowing the lawn.

Finally, these results lend themselves to the premise that there is always hope for individuals who have previously withdrawn from exercise programs, or experienced exercise lapses or relapses, to successfully adopt physically active lifestyles.

General Discussion

This study sought to explore similarities and differences among potential factors influencing exercise behavior among adherers and non-adherers in the Fit 4 Life study. The findings from this study have made significant contributions to the existing literature, particularly in regard to exercise behavior among African Americans. The exercise psychology literature has examined exercise behavior using biopsychosocial frameworks; however, the majority of these studies have been conducted using Caucasian participants. In recent years, a significant amount of research has examined exercise behavior among African Americans. Many of these studies have explored cultural influences on exercise behavior; however, most have neglected to include physiological influences on exercise behavior in their analyses. This study attempted to comprehensively explore physiological, psychosocial, and environmental influences on exercise behavior among African Americans.

In the current study, demographic, psychosocial, physiological, and social context factors were examined for both adherers and non-adherers. In general, adherers lived in smaller households, worked part-time, perceived fewer barriers to exercise, and had greater life satisfaction

than non-adherers. Adherers also had lower diastolic blood pressures, weighed less, had lower resting metabolic rates, less fat mass, and lower BMIs than non-adherers.

This study was a mixed-methods exploration of factors associated with adherence among Fit 4 Life participants. The qualitative core component was methodologically sound and provided rich, in-depth accounts of participants' experiences of adopting and maintaining regular exercise. When examining social context variables, adherers in general, were able to identify greater physical activity benefits, and seemed to develop strategies to overcome barriers to exercise, such as perceived lack of time, which enabled them to stick with the exercise program. Further, adherers were able to find social support in staff members, other participants, and coworkers which may have facilitated their adherence to the study. Adherers did not have significantly higher self-efficacy scores than non-adherers; however, results from the interviews suggest that adherers were more likely to view self-efficacy as a benefit of exercise, which may have served to facilitate their adherence. Further, adherers were more likely to see exercise as an opportunity to focus on themselves.

It is important to note that results from the supplemental quantitative component should be interpreted

with caution. The inclusion of quantitative measures permitted description of the study population, and helped substantiate themes which emerged in participants' narratives (Greene, 2007; Hesse-Biber, 2010). In some instances, diverging perspectives allow the researcher to develop new questions worthy of future exploration (Teddlie & Tashakkori, 2009). The sample size for this study was small, especially when taking into account the number of variables that were included in the analyses. Significant relationships between the aforementioned determinants and adherence, however, identify relationships which warrant further exploration. Finally, positive relationships between a variety of factors (i.e., demographic, physiological, psychosocial) reinforce the need to study adherence behavior comprehensively.

In the current study, adherers seemed to have developed some strategies for maintaining their exercise regimen; however, they articulated few during their interviews. It is possible that during the interviews, they could not recall what strategies they used. Another possible explanation is that participants may not be aware of the strategies which facilitated their adherence behavior. For example, an individual may not consider posting the exercise facility schedule in their office

cubicle a strategy; however, a practitioner may consider this reminder an effective relapse prevention strategy. Additionally, participants may have read a book or listened to music during their exercise sessions.

In Wetter et al.'s (2001) kaleidoscope model of human behavior, determinants of behavior are organized into five levels. These levels are the psychobiologic core, the cultural level, social determinants, enablers of choice, and behavioral skills. (See Figure 2.) Examples of behavioral skills, the actual processes which facilitate behavior, are setting appropriate goals, contracting, rewarding one-self, self-monitoring, and problem solving around barriers. Participants in this study, particularly non-adherers, may have benefited from learning about and implementing additional behavioral strategies.

To date, there has been no consensus on how to best operationalize adherence. This study used 65% adherence because that was the criteria for the Fit 4 Life study. The goal of the Fit 4 Life study was to evaluate the effect of exercise on blood pressure and endothelial function; therefore, adherence criteria were established in order to account for the physiological adaptations that occur as a result of regular exercise, as well as the detraining effect that takes place when one discontinues

participation. Other ways exercise adherence may be measured in research studies are the number of exercise sessions attended, total calorie expenditure, or time spent exercising at a particular intensity.

Finally, in the current study, the researcher explored current exercise behavior of former Fit 4 Life participants and found that there was no significant difference in participants' stage of change. More than 30% of all respondents reported not being currently physically active. Surprisingly, more non-adherers reported being in the maintenance stage of the transtheoretical model of exercise.

Implications for Researchers

This study examined various factors influencing exercise adherence among African Americans enrolled in the Fit 4 Life study, using a biopsychosocial perspective. Based upon this study's limitations and findings, a few suggestions are noted for individuals conducting exercise interventions and similar studies with African American populations.

The first concern was the small sample size in this study, particularly in reference to demographic and psychosocial data. Due to the focus of the Fit 4 Life study, this information was not collected when each

participant first enrolled. It was very difficult for the researcher to collect this information after participants had completed the study, particularly for non-adherers who dropped out or were excluded due to poor exercise attendance. It would be useful for researchers to form interdisciplinary teams which can examine various facets of exercise behavior, and collect this type of information at the beginning of studies.

Researchers conducting physical activity interventions should develop protocols for increasing adherence among participants in studies in which adherence is not the primary outcome. Strategies for increasing exercise adherence in research interventions are often neglected outside of the behavioral realm. Adherers in this study identified strategies to help them stick with the program, such as focusing on self and being committed to the study; however, proven cognitive-behavioral strategies (e.g., goal setting, rewards, self-monitoring) were underutilized. Further, non-adherers developed fewer strategies to stick with the program than adherers. The implementation of theoretically-based protocols may increase adherence to exercise interventions, thereby allowing researchers to better evaluate the effects of exercise on various mechanisms. These protocols may include psychoeducation,

motivational interviewing, exercise reminders, and other strategies. Further, techniques used to facilitate adherence may be delivered via numerous methods (e.g., in-person, mail, call, email, text message).

When meeting with participants, particularly when conducting interviews, it is very important to gain their trust and build rapport. The researcher referred to interviews as "a conversation" and attempted to conduct the interviews in such a manner. The researcher used the same language and terminology participants used, while still maintaining a level of professionalism. When conducting interviews it is important to remain flexible regarding the time and place of the interviews. The researcher conducted two interviews at the participants' places of employment, two in participants' homes, and the remaining in the study office. Additionally, having an African American conduct the interviews with participants of the same race/ethnicity may not be necessary for the rapport-building process; however, given the nature and content of the interviews (i.e., focus on cultural aspects of behavior), it is likely that an interviewer of a different race may have been viewed as an outsider, and would have not obtained the same responses.

The results of this study warrant implications for individuals involved in exercise and hypertension research. While participants in this study exercised at moderate intensities, many perceived the intensity to be too easy, particularly at the beginning of the study. The exercise prescription is tailored in a way that it introduces sedentary individuals to exercise without many of the negative derivatives, such as muscle soreness, and the perception of intense exertion. These responses to exercise can hinder individuals from continuing, particularly when beginning an exercise program. To that end, the evaluation that exercise is too easy may induce boredom, foster doubt regarding treatment efficacy and protocols (e.g., testing procedures) and may hinder individuals' continued participation in the intervention.

Researchers can implement a number of strategies to foster adherence to exercise, while maintaining the integrity of the prescription. First, researchers should explain, in simple language, cardiovascular responses to exercise (i.e., if you "try harder" during an exercise test, that will not translate to a more intense exercise prescription). Secondly, in interventions which include a transitional period in which participants are exercising at a lower intensity, researchers can afford participants the

opportunity to self-select their exercise intensity, within certain parameters. For example, instead of all participants exercising at 50% of their VO_2 during the first week of their exercise program, they may choose to begin at 60% of their VO_2 . This may also provide the participants with more perceived autonomy, which in turn can foster adherence. Finally, other strategies for encouraging feelings of autonomy, self-efficacy, and ultimately enjoyment include introducing participants to various types of equipment, psychoeducation during sessions, challenges/incentives (e.g., related to dietary practices, cardiovascular and exercise knowledge), and periodic group workouts. These strategies may be beneficial for researchers utilizing exercise prescriptions in the management of other conditions, as well.

Finally, participants in this study, especially non-adherers, seemed to have little knowledge regarding current physical activity recommendations. Given this fact, and the importance participants placed on education, researchers should provide education to participants regarding the types and amounts of physical activity required to promote health. This may be an important strategy for helping participants transition to being active outside of a structured research setting. To that

end, researchers should collect follow-up data on participants previously enrolled in exercise intervention studies.

Implications for Practitioners

The findings from this study have several implications for individuals working to promote physical activity participation among African American populations. More specifically, participants provided several strategies that they believed were necessary to encourage physical activity. The suggestions based upon research findings are as follows:

1. *Education is key.* Practitioners should provide education on the cognitive/mental and physical benefits of exercise. Further, individuals need to be better educated on the causes of chronic diseases (e.g., what is preventable and what is not), as well as the role exercise can play in the prevention and attenuation of these diseases. More specifically, there needs to be greater education regarding hypertension among African Americans, and the roles diet and exercise play in its management. African Americans may experience barriers related to accessibility, therefore information should not just focus on communicating risks of physical inactivity and poor

diet, but focus on communicating resources available in their communities.

2. *Take it to the streets.* Practitioners (as well as researchers) should become more active in African American communities. Becoming involved in and/or organizing health fairs, cooking demonstrations, hair shows, and utilizing already existing structures, such as churches and community centers, may facilitate African Americans becoming more involved in physical activity programs.

3. *Don't exercise.* Participants in this study, especially non-adherers, believed that the term "exercise" had a negative connotation, and therefore its use during programming may deter some individuals from engaging in activities perceived to be "exercise." Practitioners should create other names for exercise programs that may not elicit negative responses. Examples may be line dancing and Zumba.

4. *Speak the language.* Practitioners should identify elements of the culture that resonate with individuals and align being physically active with those cultural values. For example, similar to other studies, results revealed that African American women may serve as caregivers for both older and younger individuals, thereby

neglecting to make their own health a priority. Literature and programming used to promote exercise among this population should then acknowledge the importance of the role of caregiver, but reinforce the notion that they can better care for others when they themselves are cared for.

5. *Mental skills aren't just for athletes.* Few participants in this study seemed to develop concrete strategies for sticking with their exercise program. Practitioners should educate individuals on various cognitive and behavioral strategies that have been shown to facilitate adherence to exercise, such as contracting, rewards, time management, setting realistic goals, positive self-talk, and social support. Implementing a "game plan" may empower individuals to persist in their exercise endeavors.

6. *Get the family involved.* A potential approach to increasing physical activity among African Americans may be to implement activities centered on the family unit. Organizing a family activity night at a local community center, a mother-daughter cooking class, or a church health fair for all ages are examples of events that may appeal to different generations. Organizing events such as these would allow practitioners to tackle the barrier of ancestral influence by educating older and younger

generations simultaneously, while embracing the collective nature commonplace among many African Americans. Appealing to the family unit, rather than to individuals, may create a foundation for social support and potentially elicit greater motivation to engage in health behaviors.

7. *Learn to go it alone.* Relapse prevention is a useful behavioral skill in which one attempts to decrease the likelihood of relapse on one's healthy behavior by preparing for potential pitfalls. An example of one such pitfall is related to social support. Participants in this study expressed that after failed attempts to exercise with friends and family, they eventually conceded had to focus on themselves. This may be demoralizing; however, with help, individuals may use it as an opportunity to refine their mental skills.

CHAPTER 5
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS
FOR FUTURE RESEARCH

The purpose of this study was two-fold. The first purpose was to examine patterns of adherence and to describe the influences of demographic, psychosocial, physiological, and sociocultural variables on adherence among African Americans enrolled in the Fit 4 Life study. The second purpose was to determine follow-up exercise behaviors of participants previously enrolled in the Fit 4 Life study. This chapter is presented in the following sections: (a) summary, (b) conclusions, and (c) recommendations for future research.

Summary

This study employed a mixed method parallel design, consisting of a qualitatively-driven core component and a quantitative supplementary component. Demographic, physiological, and psychosocial data were collected on 75 participants (see Chapter 4 for detailed demographics) in the Fit 4 Life study. Participants were classified as adherers or non-adherers, based upon whether or not they completed the 6-month exercise intervention portion of the study. Semi-structured interviews were then conducted on a

subgroup of the survey respondents in order to gain an in-depth understanding of social context and cultural influences on exercise and behavior change, for both adherers and non-adherers.

Interviews were conducted, recorded, transcribed verbatim, and coded in order to identify raw data themes, subthemes, and themes. The thematic analysis of the interviews resulted in the emergence of four major themes, with 10 associated subthemes that described the participants' perceptions of exercise, their environment, and how these elements influence exercise behavior. The first theme was *benefits*, and dealt with participants' perceived benefits of exercise and physical activity. These benefits were divided into the two subthemes: (a) cognitive/mental benefits and (b) physical benefits. The second theme, *barriers*, dealt with the factors participants perceived to hinder participation in exercise and physical activity. Barriers to exercise were discussed on three levels: (a) personal barriers, (b) community barriers, and (c) barriers participants experienced specific to participation in the Fit 4 Life study.

The third theme was *facilitators* and focused on strategies participants had developed to help them be physically active, as well as motivators for physical

activity. The associated subthemes were: (a) personal facilitators and (b) study facilitators. The final theme that emerged was *African American* and dealt with participants' perceived cultural characteristics, as well as navigating cultural barriers to exercise and physical activity. The associated subthemes were: (a) cultural characteristics, (b) culturally specific barriers, and (c) community outreach.

Adherers were able to identify greater physical activity benefits, and seemed to develop strategies to overcome barriers to exercise, including finding sources of social support outside of their friends and family. Adherers were also more likely to view self-efficacy as a benefit of exercise, as well as view exercise as an opportunity to focus on themselves.

The quantitative component of the study included the use of several measures, which included a demographic questionnaire, the Exercise Stages of Change - Short Form (SOC), Exercise Benefits/Barriers Scale (EBBS), Barriers Self-Efficacy Scale (BARSE), Multidimensional Health Locus of Control Scale (MHLC), Satisfaction with Life Scale (SLS), and various physiological measures (e.g., BMI, blood pressure, fasting glucose, cholesterol). Through a series of chi-square analyses and independent samples t-tests,

quantitative results revealed that adherers lived in smaller households and worked part-time. Adherers also had lower diastolic blood pressures, weighed less, had lower resting metabolic rates, less fat mass, and lower BMIs than non-adherers. Finally, adherers perceived fewer barriers to exercise, and had greater life satisfaction than non-adherers.

Conclusions

Given the results, as well as the limitations and delimitations, the following conclusions were made from the current study. Each conclusion was derived from the study aims and associated research questions; however, they are presented in such a way that represents the meta-inferences drawn from the data.

1. This study supported the premise that there are demographic, physiological, and psychosocial characteristics that influence exercise behavior. Adherers and non-adherers were relatively homogenous in regard to most demographic and physiological characteristics; however, non-adherers lived in larger households than adherers and were more likely to be employed part-time. Additionally, adherers had lower diastolic blood pressures, weighed less, and had lower BMIs, RMRs and fat mass, than non-adherers. Finally, non-adherers perceived lower life

satisfaction than adherers, perceived little spousal support for exercise, and perceived less family support than adherers.

2. Participants in this study were aware of several exercise benefits; however, physical health benefits were acknowledged more often than cognitive/mental benefits among both groups. Further, adherers identified more cognitive/mental benefits than non-adherers.

3. Adherers perceived fewer barriers to exercise than non-adherers. Both groups indicated that salient barriers were those related to negative evaluation in response to the physical sensations of exercise (e.g., exercise tires me). Both adherers and non-adherers experienced barriers related to lack of social support, job demands, and caring for others. A salient barrier for non-adherers was lack of motivation. In addition to personal barriers, community barriers, such as lack of knowledge and perceived lack of time and motivation resonated with the participants. Non-adherers distinguished differences in barriers to exercise, in general, and the exercise program for the study. Non-adherers experienced issues related to time/convenience in regard to the study. Both adherers and non-adherers perceived the moderate-intensity exercise prescription as a barrier to participation in the study.

4. Exercise self-efficacy emerged as a benefit of, as well as a facilitator of exercise; however, this theme was more common among adherers than non-adherers. Adherers and non-adherers did not significantly differ in regard to self-efficacy to overcome barriers. This divergence of the data warrants further exploration.

5. Both adherers and non-adherers experienced barriers related to lack of social support, job demands, and caring for others. An additional salient barrier for non-adherers was lack of motivation. In addition to personal barriers, community barriers, such as lack of knowledge and perceived lack of time and motivation, resonated with the participants. Non-adherers distinguished differences in barriers to exercise, in general, and the exercise program for the study. Non-adherers experienced issues related to time/convenience in regard to the study. Both adherers and non-adherers perceived the moderate-intensity exercise prescription as a barrier to participation in the study.

Recommendations for Future Research

This study took a step toward looking at exercise adherence among an African American population from a biopsychosocial perspective, thereby acknowledging exercise behavior as a complex phenomenon. The following

recommendations for future research are suggested by the limitations, results, and conclusions of the current study:

1. This study was limited to exercise during the adoption stage (i.e., the first six months). Future work should include longitudinal studies in order to examine factors influencing both exercise adoption and maintenance. Martin and colleagues (2000) suggest that different variables may predict different types of exercise adherence (i.e., frequency, intensity, duration), and that researchers should look at adherence to each of these elements. Further, different variables may influence adherence at different time points in a study (Martin et al., 2000).

2. Future studies should include follow-up in order to evaluate the efficacy of exercise interventions increasing long-term participation (Marcus et al., 2000). Follow-up should be conducted at uniform time points (e.g., 1 month after intervention, 6 months, 12 months).

3. Future studies should be designed with larger sample sizes in order to conduct the appropriate analyses to identify predictors of, and interactive effects of determinants on, adherence among African American and other populations.

4. Future studies should continue to explore adherence to exercise using a biopsychosocial framework. Variables that were significant or approached significance in the current study may be of particular interest (e.g., body mass index, blood pressure, perceived barriers, life satisfaction). In addition, variables that were controlled in the current study (e.g., fasting glucose, cholesterol, race/ethnicity) warrant further exploration.

5. Similarly, future studies should further explore a link between behavioral and physiological/biological variables, in an attempt to answer the question, "Do behavioral factors mediate changes in biological factors?"

6. Previous research suggests that physical activity behavior is influenced by genetic factors (Hernandez & Blazer, 2006); therefore, future studies should continue to investigate the interaction of genetic, psychological, social, and physiological influences on exercise behavior and cognitions.

7. Future studies should further explore the role of social support in exercise adherence, particularly among African Americans. Participants in this study did not recognize their sedentary friends and family as a barrier to exercise; therefore, future studies should look at how

participants with no or little support for exercise are able to adopt/maintain an exercise program.

8. Similarly, future studies should be conducted with particular emphasis on the family unit and adherence to exercise and other healthy behaviors.

9. Cultural influences on exercise behavior warrant further exploration among various ethnic/minority populations, utilizing both qualitative and quantitative methods of data collection.

10. Qualitative exploration of individuals', particularly African Americans', exercise- and health-related cognitions should be conducted before and after exercise interventions to see how they change over time.

11. Future studies should be conducted on exercise adherence interventions, particularly with African American populations. Cognitive-behavior strategies have been proven effective in increasing exercise adherence; however, to the author's knowledge, no studies to date have done so among African Americans. Further, no studies have implemented culturally-tailored cognitive behavioral strategies among African Americans.

REFERENCES CITED

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- American Heart Association. (2012, February 10). About high blood pressure. Retrieved from http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHighBloodPressure/About-High-Blood-Pressure_UCM_002050_Article.jsp#.Tud14vJhuuI
- Annesi, J., & Unruh, J. (2007). Effects of the Coach Approach intervention on drop-out rates among adults initiation exercise programs at nine YMCAs over three years. *Perceptual and Motor Skills*, 104, 459-466.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215. doi:10.1037/0033-295X.84.2.191
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Banks-Wallace, J. (2000). Staggering under the weight of responsibility: The impact of culture on physical activity among African American women. *Journal of Multicultural Nursing & Health*, 6(3), 24-30.

- Banks-Wallace, J., & Conn, V. (2002). Interventions to promote physical activity among African American women. *Public Health Nursing, 19*(5), 321-335.
doi:10.1046/j.1525-1446.2002.19502.x
- Blair, S., Cheng, Y., Holder, J. (2001). Is physical activity or physical fitness more important in defining health benefits? *Medicine & Science in Sports & Exercise, 33*, S395-399.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.
- Brown, R. V., Kral, B. G., Yanek, L. R., Vaidya, D., Nyquist, P. A., Levine, D. M.,... Becker, D. M. (2012). Ethnic specific determinants of exercise capacity in a healthy high risk population. *Medicine & Science in Sport & Exercise*. Advance online publication. doi:10.1249/MSS.0b013e3182456990
- Buckworth, J., & Dishman, R.K. (2002). *Exercise psychology*. Champaign, IL: Human Kinetics.
- Carretero, O. A., & Oparil, S. (2000). Essential hypertension: Part I: Definition and etiology. *Circulation, 101*(3), 329-335.
doi:10.1161/01.CIR.101.3.329

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100(2), pp. 126-131. Retrieved from <http://www.jstor.org/stable/20056429>

Centers for Disease Control and Prevention. (1999). *Physical activity and health: A report of the surgeon general executive summary*. Retrieved from <http://www.cdc.gov/nccdphp/sgr/summary.htm>

Centers for Disease Control and Prevention. (2010a). *National average: Summary of physical activity*. Retrieved from <http://apps.nccd.cdc.gov/PASurveillance/StateSumResultV.asp>

Centers for Disease Control and Prevention. (2010b). *National average: Recommended physical activity by age*. Retrieved from <http://apps.nccd.cdc.gov/PASurveillance/DemoCompareResultV.asp?State=1&Cat=1&Year=2008&Go=GO#result>

Centers for Disease Control and Prevention. (2010c). *National average: Recommended physical activity by education*. Retrieved from

<http://apps.nccd.cdc.gov/PASurveillance/DemoCompareResultV.asp?State=1&Cat=2&Year=2008&Go=GO#result>

Centers for Disease Control and Prevention. (2010d).

National average: Recommended physical activity by gender. Retrieved from

<http://apps.nccd.cdc.gov/PASurveillance/DemoCompareResultV.asp?State=1&Cat=3&Year=2008&Go=GO#result>

Centers for Disease Control and Prevention. (2010e).

National average: Recommended physical activity by race. Retrieved from

<http://apps.nccd.cdc.gov/PASurveillance/DemoCompareResultV.asp?State=1&Cat=4&Year=2008&Go=GO#result>

Centers for Disease Control and Prevention. (2011). High blood pressure facts. Retrieved from

<http://www.cdc.gov/bloodpressure/facts.htm>

Colcombe, S., & Kramer, A. F. (2003). Fitness effects on the cognitive function of older adults: A meta-analytic study. *Psychological Science*, 14(2), pp. 125-130. Retrieved from

<http://www.jstor.org/stable/40063782>

Courneya, K., Estabrooks, P., & Nigg, C. (1997). A simple reinforcement strategy for increasing attendance at a fitness facility. *Health Education & Behavior*, 24, 708-715.

- Courneya, K., Mackey, J., Bell, G., Jones, L., Field, C., & Fairey, A. (2003). Randomized controlled trial of exercise training in postmenopausal breast cancer survivors: Cardiopulmonary and quality of life outcomes. *Journal of Clinical Oncology, 21*(9), 1660-1668. doi:10.1200/JCO.2003.04.093
- De Moor, M., Beem, A., Stubbe, J., Boomsma, D., & De Geus, E. (2006). Regular exercise, anxiety, depression and personality: A population-based study. *Preventive Medicine, 42*(4), 273-279. doi:10.1016/j.ypmed.2005.12.002
- Diener, E., Emmons, R., Larsen, R., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=s3h&AN=6385463&site=ehost-live&scope=site>
- Dishman, R. K. (2001). The problem of exercise adherence: Fighting sloth in nations with market economies. *Quest, 53*(3), 279-398. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=s3h&AN=6155196&site=ehost-live&scope=site>
- Dishman, R., & Gettman, L. (1980). Psychobiologic influences on exercise adherence. *Journal of Sport Psychology, 2*(4), 295-310.

- Dishman, R., Sallis, J., & Orenstein, D. (1985). The determinants of physical activity and exercise. *Public Health Reports*, 100(2), pp. 158-171. Retrieved from <http://www.jstor.org/stable/20056432>
- Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science*, 196(4286), pp. 129-136. Retrieved from <http://www.jstor.org/stable/1743658>
- Engel, G. (1980). The clinical application of the biopsychosocial model. *The American Journal of Psychiatry*, 137, 535-544.
- Fox, K. (2000). Self-esteem, self-perceptions and exercise. *International Journal of Sport Psychology*, 31, 228-240.
- Grant, N., Wardle, J., & Steptoe, A. (2009). The relationship between life satisfaction and health behavior: A cross-cultural analysis of young adults. *International Journal of Behavioral Medicine*, 16(3), 259-268.
- Griffith, D., Gunter, K., & Allen, J. (2011). Male gender role strain as a barrier to African American men's physical activity. *Health Education & Behavior*, 38(5), 482-491. doi:10.1177/1090198110383660

- Hagberg, J., Park, J., & Brown, M. (2000). The role of exercise training in the treatment of hypertension: An update. *Sports Medicine*, 30(3), 193-206. Retrieved from <http://articles.sirc.ca/search.cfm?id=S-660062>
- Harley, A., Odoms-Young, A., Beard, B., Katz, M., & Heaney, C. (2009). African American social and cultural contexts and physical activity: Strategies for navigating challenges to participation. *Women & Health*, 49(1), 84-100.
- Harvey, R., & Afful, S. (2011). Racial typicality, racial identity, and health behaviors: A case for culturally sensitive health interventions. *Journal of Black Psychology*, 37(2), 164-184.
doi:10.1177/0095798410376244
- Haskell, W., Lee, M., Pate, R., Powell, K., Blair, S., Franklin, B., Macera, C., Heath, G., Thompson, P., Bauman, A. (2007). Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Medicine & Science in Sports & Exercise*, 39(8), 1423-1434.
- Hellsten, L., Nigg, C., Norman, G., Burbank, P., Braun, L., Breger, R.,... Wang, T. (2008). Accumulation of behavioral validation evidence for physical activity

stage of change. *Health Psychology*, 27(1), S43-S53.

doi:10.1037/0278-6133.27.1(Suppl.).S43

Hernandez, L., & Blazer, D. (2006). *Genes, behavior, and the social environment: Moving beyond the nature/nurture debate*. Washington, DC: National Academies Press. Retrieved from

<http://www.nap.edu/catalog/11693.html>

Hertz, R., Unger, A., Cornell, J., & Saunders, E. (2005).

Racial disparities in hypertension prevalence, awareness, and management. *Archives of Internal Medicine*, 165(18), 2098-2104.

doi:10.1001/archinte.165.18.2098

Hesse-Biber, S. (2010). *Mixed methods research: Merging theory with practice*. New York: Guilford Press.

Icek, A. (1991). The theory of planned behavior.

Organizational Behavior and Human Decision Processes, 50(2), 179-211. doi:10.1016/0749-5978(91)90020-T

Irwin, M., Tworoger, S., Yasui, Y., Rajan, B., McVarish, L., LaCroix, K.,... McTiernan, A. (2004). Influence of demographic, physiologic, and psychosocial variables on adherence to a yearlong moderate-intensity exercise trial in postmenopausal women. *Preventive Medicine*, 39(6), 1080-1086. doi:10.1016/j.ypmed.2004.04.017

- Izquierdo-Porrera, A., Powell, C., Reiner, J., & Fontaine, K. (2002). Correlates of exercise adherence in an african american church community. *Cultural Diversity and Ethnic Minority Psychology, 8*(4), 389-394.
doi:10.1037/1099-9809.8.4.390
- Jennen, C., & Uhlenbruck, G. (2004). Exercise and life-satisfactory fitness: Complementary strategies in the prevention and rehabilitation of illnesses. *Evidence-Based Complementary and Alternative Medicine, 1*(2), 157-165.
- Johnstone, A., Murison, S., Duncan, J., Rance, K., & Speakman, J. (2005). Factors influencing variation in basal metabolic rate include fat-free mass, fat mass, age, and circulating thyroxine but not sex, circulating leptin, or triiodothyronine. *The American Journal of Clinical Nutrition, 82*(5), 941-948.
- Kennedy, B., Ard, J., Harrison, L., Conish, B., Kennedy, E., Levy, E., & Brantley, P. (2007). Cultural characteristics of African Americans: Implications for the design of trials that target behavior and health promotion programs. *Ethnicity & Disease, 17*(3), 548-554.
- King, N., & Horrocks, C. (2010). *Interviews in qualitative research*. London: Sage.

- Kokkinos, P., & Papademetriou, V. (2000). Exercise and hypertension. *Coronary Artery Disease, 11*, 99-102.
- Kreuter, M., Lukwago, S., Bucholtz, D., Clark, E., & Sanders-Thompson, V. (2003). Achieving cultural appropriateness in health promotion programs: Targeted and tailored approaches. *Health Education & Behavior, 30*(2), 133-146. doi:10.1177/1090198102251021
- Kvale, S., & Brinkmann, S. (2008). *Interviews: Learning the craft of qualitative research interviewing*. Thousand Oaks, CA: Sage.
- Laumann, E., Levinson, W., Lindau, S., & Waite, L. (2003, Summer; 2012/1). Synthesis of scientific disciplines in pursuit of health: The interactive biopsychosocial model. *46*(3), S74+. Retrieved from http://go.galegroup.com/ps/i.do?id=GALE%7CA106473990&v=2.1&u=temple_main&it=r&p=ITOF&sw=w
- Lautenschlager, N., Cox, K., Flicker, L., Foster, J., van Bockxmeer, F., Xiao, J.,... Almeida, O. (2008). Effect of physical activity on cognitive function in older adults at risk for alzheimer disease. *JAMA: The Journal of the American Medical Association, 300*(9), 1027-1037. doi:10.1001/jama.300.9.1027
- Lee, R., Nigg, C., DiClemente, C., & Courneya, K. (2001). Validating motivational readiness for exercise

behavior with adolescents. *Research Quarterly in Exercise and Sport*, 72, 401-410.

Lenfant, C., Chobanian, A., Jones, D., & Roccella, E. (2003). Seventh report of the joint national committee on the prevention, detection, evaluation, and treatment of high blood pressure (JNC 7). *Circulation*, 107(24), 2993-2994.
doi:10.1161/01.CIR.0000080481.62058.03

Lindau, S., Laumann, E., Levinson, W., & Waite, L. (2003). Synthesis of scientific disciplines in pursuit of health: The interactive biopsychosocial model. *Perspectives in Biology and Medicine*, 46, S74-S86.

Lloyd-Jones, D., Adams, R., Carnethon, M., De Simone, G., Ferguson, T. B.,... for the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. (2009). Heart disease and stroke Statistics—2009 update. *Circulation*, 119(3), 480-486.
doi:10.1161/CIRCULATIONAHA.108.191259

Lukwago, S., Kreuter, M., Bucholtz, D., Holt, C., & Clark, E. (2001). Development and validation of brief scales to measure collectivism, religiosity, racial pride, and time orientation in urban African American women. *Family & Community Health*, 24(3), 63-71.

- Marcus, B., Forsyth, L., Stone, E., Dubbert, P., McKenzie, T., Dunn, A., & Blair, S. (2000). Physical activity behavior change: Issues in adoption and maintenance. *Health Psychology, 19*(1), 32-41. doi:10.1037/0278-6133.19.Suppl1.32
- Marquez, D., & McAuley, E. (2006). Social cognitive correlates of leisure time physical activity among latinos. *Journal of Behavioral Medicine, 29*(3), 281-289. doi:10.1007/s10865-006-9055-6
- Martin, K., Bowen, D., Dunbar-Jacob, J., & Perri, M. (2000). Who will adhere? Key issues in the study and prediction of adherence in randomized controlled trials. *Controlled Clinical Trials, 21*(5, Supplement 1), S195-S199. doi:10.1016/S0197-2456(00)00078-7
- McAuley, E. (1992). The role of efficacy cognitions in the prediction of exercise behavior in middle-aged adults. *Journal of Behavioral Medicine, 15*(1), 65-88.
- McAuley, E., Mailey, E., Mullen, S., Szabo, A., Wójcicki, T., White, S.,... Kramer, A. (2011). Growth trajectories of exercise self-efficacy in older adults: Influence of measures and initial status. *Health Psychology, 30*(1), 75-83. doi:10.1037/a0021567
- Mihalko, S., Brenes, G., Farmer, D., Katula, J., Balkrishnan, R., & Bowen, D. (2004). Challenges and

innovations in enhancing adherence. *Controlled Clinical Trials*, 25(5), 447-457.

doi:10.1016/j.cct.2004.07.003

National Counselor Education Program (2002). Third report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (adult treatment panel III) final report. *Circulation*, 106(25), 3143-3421.

Newton, R., & Perri, M. (2004). A randomized pilot trial of exercise promotion in sedentary African American adults. *Ethnicity & Disease*, 14, 548-557.

Nigg, C., & Kerry, S. (1997). Maintaining attendance at a fitness center: An application. *Behavioral Medicine*, 23(3), 130. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=pbh&AN=9712115208&site=ehost-live&scope=site>

Nobles, W. (1991). African philosophy: Foundations of black psychology. In R. Jones (Ed.), *Black psychology* (pp. 180-192). Berkeley, CA: Cobb & Henry.

Norman, G., Benisovich, S., Nigg, C., & Rossi, J. (1998). Examining three exercise staging algorithms in two samples. *Annals of Behavioral Medicine*, 20, S11.

- Ong, K., Cheung, B., Man, Y., Lau, C., & Lam, K. (2007). Prevalence, awareness, treatment, and control of hypertension among United States adults 1999-2004. *Hypertension*, 49(1), 69-75.
doi:10.1161/01.HYP.0000252676.46043.18
- Ostchega, Y., Yoon, S., Hughes, J., & Louis, T. (2008). *Hypertension awareness, treatment, and control - continued disparities in adults: United States, 2005-2006. NCHS data brief*. Hyattsville, MD: National Center for Health Statistics.
- Paluska, S. A., & Schwenk, T. L. (2000). Physical activity and mental health: Current concepts. *Sports Medicine*, 29(3), 167-180. Retrieved from <http://articles.sirc.ca/search.cfm?id=S-166361>
- Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment*, 5(2), 164-172. doi:10.1037/1040-3590.5.2.164
- Pavot, W., Diener, E., Colvin, C., & Sandvik, E. (1991). Further validation of the satisfaction with life scale: Evidence for the cross-method convergence of well-being measures. *Journal of Personality Assessment*, 57(1), 149. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=s3h&AN=6391659&site=ehost-live&scope=site>

- Prochaska, J., & DiClemente, C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51*(3), 390-395. doi:10.1037/0022-006X.51.3.390
- Prochaska, J., DiClemente, C., & Norcross, J. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47*(9), 1102-1114. doi:10.1037/0003-066X.47.9.1102
- Prochaska, J., & Marcus, B. (1994). The transtheoretical model: Applications to exercise. In R. Dishman (Ed.), *Advances in exercise adherence* (pp. 161-180). Champaign, IL: Human Kinetics.
- Quinn, M., & Guion, W. (2010). A faith-based and cultural approach to promoting self-efficacy and regular exercise in older African American women. *Gerontology & Geriatrics Education, 31*(1), 1-18.
- Resnick, B., Orwig, D., Magaziner, J., Wynne, C. (2002). The effect of social support on exercise behavior in older adults. *Clinical Nursing Research, 11*(1), 52-70.
- Resnicow, K., Baranowski, T., Ahluwalia, J., & Braithwaite, R. (1999). Cultural sensitivity in public health: Defined and demystified. *Ethnicity & Disease, 9*(1), 10-21.

- Rhodes, R., Martin, A., Taunton, J., Rhodes, E., Donnelly, M., & Elliot, J. (1999). Factors associated with exercise adherence among older adults: An individual perspective. *Sports Medicine*, 28(6), 397-411.
- Retrieved from
<http://articles.sirc.ca/search.cfm?id=S-159205>
- Rosenstock, I. (1990). The health belief model: Explaining health behavior through expectancies. In K. Glanz, F. Lewis, & B. Rimer (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 39-62). San Francisco, CA: Jossey-Bass.
- Sechrist, K., Walker, S., & Pender, N. (1987). Development and psychometric evaluation of the exercise benefits/barriers scale. *Research in Nursing & Health*, 10(6), 357-365. doi:10.1002/nur.4770100603
- Seidman, I. (1998). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*. Amherst, MA: Teachers College Press.
- Siahpush, M., Spittal, M., & Singh, G. (2008). Happiness and life satisfaction prospectively predict self-rated health, physical health, and the presence of limiting, long-term health conditions. *American Journal of Health Promotion*, 23(1), 18-26.

- Siddiqi, Z., Tiro, J., & Shuval, K. (2011). Understanding impediments and enablers to physical activity among African American adults: A systematic review of qualitative studies. *Health Education Research, 26*(6), 1010-1024. doi:10.1093/her/cyr068
- Sherwood, N., & Jeffery, R. (2000). The behavioral determinants of exercise: Implications for physical activity interventions. *Annual Review of Nutrition, 20*(1), 21-44.
- Shields, C., Brawley, L., & Lindover, T. (2005). Where perception and reality differ: Dropping out is not the same as failure. *Journal of Behavioral Medicine, 28*(5), 481-491. doi:10.1007/s10865-005-9012-9
- Stubbe, J., de Moor, M., Boomsma, D., & de Geus, E. (2007). The association between exercise participation and well-being: A co-twin study. *Preventive Medicine, 44*, 148-152. doi:10.1016/j.ypmed.2006.09.002
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Thousand Oaks, CA: SAGE Publications.
- Trost, S., Owen, N., Bauman, A., Sallis, J., & Brown, W. (2002). Correlates of adults' participation in

physical activity: review and update. *Medicine & Science in Sports & Exercise*, 34, 1996-2001.

Walcott-McQuigg, J., & Prohaska, T. (2001). Factors influencing participation of African American elders in exercise behavior. *Public Health Nursing*, 18(3), 194-203. doi:10.1046/j.1525-1446.2001.00194.x

Wallace, J. P. (2003). Exercise in hypertension: A clinical review. *Sports Medicine*, 33, 585+. Retrieved from http://go.galegroup.com/ps/i.do?id=GALE%7CA200844753&v=2.1&u=temple_main&it=r&p=AONE&sw=w

Wallace, L., Buckworth, J., Kirby, T., & Sherman, W. (2000). Characteristics of exercise behavior among college students: Application of social cognitive theory to predicting stage of change. *Preventive Medicine*, 31(5), 494-505. doi:10.1006/pmed.2000.0736

Wallston, K. A. (1991). The importance of placing measures of health locus of control beliefs in a theoretical context. *Health Education Research Theory and Practice*, 6, 251-252.

Wallston, K. A. (1992). Hocus-pocus, the focus isn't strictly on locus: Rotter's social learning theory modified for health. *Cognitive Therapy and Research*, 16, 183-199.

- Wallston, K. A. (2005). The validity of the multidimensional health locus of control scales. *Journal of Health Psychology, 10*(5), 623-631. doi:10.1177/1359105305055304
- Wallston, K., Stein, M., & Smith, C. (1994). Form C of the MHLC scales: A condition-specific measure of locus of control. *Journal of Personality Assessment, 63*(3), 534. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=s3h&AN=6384443&site=ehost-live&scope=site>
- Wallston, K., Wallston, B., & DeVellis, R. (1978). Development of the multidimensional health locus of control (MHLC) scales. *Health Education & Behavior, 6*(1), 160-170. doi:10.1177/109019817800600107
- Wang, Y., & Wang, Q. (2004). The prevalence of prehypertension and hypertension among US adults according to the new joint national committee guidelines: New challenges of the old problem. *Archives of Internal Medicine, 164*(19), 2126-2134. doi:10.1001/archinte.164.19.2126
- Warburton, D., Nicol, C., & Bredin, S. (2006). Health benefits of physical activity: The evidence. *CMAJ: Canadian Medical Association Journal, 174*(6), 801-809. Retrieved from

<http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=20037748&site=ehost-live&scope=site>

- Warren-Findlow, J., Seymour, R. B., Brunner Huber, L. R. (2012). The association between self-efficacy and hypertension self-care activities among African American adults. *Journal of Community Health, 35*, 15-24. doi: 10.1007/s10900-011-9410-6
- Weinberg, R., & Gould, D. (2010). *Foundations of sport and exercise psychology* (5th ed.). Champaign, IL: Human Kinetics.
- Wetter, A., Goldberg, J., King, A., Sigman-Grant, M., Baer, R., Crayton, E.,... Warland, R. (2001). How and why do individuals make food and physical activity choices? *Nutrition Reviews, 59*(3), S11-S20. doi:10.1111/j.1753-4887.2001.tb06981.x
- Wexler, R., Feldman, D., Larson, D., Sinnott, L., Jones, L., & Miner, J. (July-August 2008). Adoption of exercise and readiness to change differ between whites and African Americans with hypertension: A report from the Ohio State University primary care practice-based research network (OSU-PCPBRN). *The Journal of the American Board of Family Medicine, 21*(4), 358-360. doi:10.3122/jabfm.2008.04.070175

- White, J., & Parham, T. (1990). *The psychology of blacks: An African American perspective*. Englewood Cliffs, NJ: Cobb & Henry.
- Wilbur, J., Miller, A., Chandler, P., & McDevitt, J. (2003). Determinants of physical activity and adherence to a 24-week home-based walking program in african american and caucasian women. *Research in Nursing & Health, 26*(3), 213-224.
doi:10.1002/nur.10083
- Williams, D., Lewis, B., Dunsiger, S., Whiteley, J., Papandonatos, G., Napolitano, M., Bock, B., Ciccolo, J., & Marcus, B. (2008). Comparing psychosocial predictors of physical activity adoption and maintenance. *Annals of Behavioral Medicine, 36*(2), 186-194. doi:10.1007/s12160-008-9054-7
- Wing, R. (2000). Cross-cutting themes in maintenance of behavior change. *Health Psychology, 19*(1, Suppl), 84-88. doi:10.1037/0278-6133.19.Suppl1.84
- Woodard, C., & Berry, M. (2001). Enhancing adherence to prescribed exercise: Structured behavioral interventions in clinical exercise programs. *Journal of Cardiopulmonary Rehabilitation, 21*, 201-209.
- World Health Organization. (2012, June 20). Global database on body mass index. Retrieved from

[http://apps.who.int/bmi/index.jsp?introPage=intro_3.ht
ml](http://apps.who.int/bmi/index.jsp?introPage=intro_3.html)

APPENDIX A
FIT 4 LIFE STUDY CONSENT FORM

Project Title: Genetics of In Vivo and In Vitro Endothelial Function in African Americans

IRB Protocol #: 10831

**Participant's Name
and ID#:**

Investigators: Michael D. Brown, Ph.D.
Associate Professor
Temple University
College of Health Professions
Department of Kinesiology

Deborah L. Crabbe, MD
Associate Professor, Medicine
Section of Cardiology
Cardiovascular Research Center
Temple University School of Medicine

M. Abul Kashem, MD, PhD

Section of Cardiology
Cardiovascular Research Center
Temple University School of Medicine

This study is funded by the National Heart, Lung, and Blood Institute of the National Institutes of Health.

1. PURPOSE OF THE STUDY

African Americans have hypertension more often than any other population in the United States. Most of the time, African Americans get hypertension at an earlier age and it causes more damage. Changes that happen to the blood vessels (the hollow tubes that carry blood through the body) may help to explain how a person gets high blood pressure. It is also known that a person's genetic make-up can play a role in getting hypertension. In most people, exercise can help to make these damaged blood vessels better, but a person's genetic make-up may affect how well exercise works for them.

You are being asked to join this study because you are between 40-75 years old and have a blood pressure between 120/80 and 159/99.

This is a research study and the purpose of the study is to understand how aerobic exercise and genes affect your blood pressure and blood vessels. Examples of aerobic exercise are fast walking, bicycling, and stair stepping.

2. DESCRIPTION OF THE PROJECT

If you qualify for the study, you will be enrolled for a total of 9-10 months. This includes a screening process, a diet, exercising, and testing before and after the exercise program. You will be one of many people participating in this study at Temple University.

This is not a weight loss study. In fact, the investigators want you to keep your body weight about the same during the study so that they can only look at the effects of exercise on your blood pressure and blood vessels. If you are a woman and taking hormone replacement medication for menopause, then you will continue your usual medication as prescribed by your doctor. A table showing the visits you will make and the amount of time needed for each visit is shown on the last page of this consent form.

Screening

You will have two or three separate screening visits to Dr. Brown's laboratory in the Department of Kinesiology at Temple University.

The first screening visit will take place in the morning after you have not eaten for 12 hours. Once you arrive to the laboratory, the staff will review with you what you will be doing on this first visit. First, you will give a urine sample for testing and then you will have your weight, height, and blood pressure measured. To give the urine sample, the staff will give you the appropriate items depending on if you are a man or a woman which you will take to the restroom next to the laboratory. You will collect some of your urine in the plastic container and return to the laboratory. The staff will then take the container of urine and dispose of the urine collection containers. Next, you will sit quietly

for 15 minutes and then your blood pressure will be measured. You will then have a blood sample taken from your arm by staff trained in the procedure. The staff member will tighten a band around your upper arm, wipe your arm with alcohol and then insert a small needle in a vein in your arm. Three tubes of blood will be filled. One tube will be used to measure chemicals in your blood like glucose and salt in order get information about your health. The second tube of blood will be used to measure cholesterol and fat levels and the third tube will be for getting your DNA (Genetic material). The total amount of blood that will be taken is about 1½ tablespoons. The total time for this visit is approximately 1 hour.

It is possible that some of your DNA will also be frozen for future studies. However, this can only be done if you sign a separate consent form indicating that the investigators can store a sample of your DNA for future use. If you decline to give consent for storage and future use of you samples, this will not affect your participation in the study.

If you are not using any medicine to lower your blood pressure, and your blood pressure is between 120/80 and 159/99, then you will qualify for the next screening visit. If you are using only one medicine to lower your blood pressure, then your blood pressure must be less than 130/85 in order to slowly stop your medication. If it is higher than this, then you will not be allowed to participate in the study. The study physician, Dr. Crabbe, will watch over the stopping of your medicine. Before your medication is slowly tapered, you will visit Dr. Brown's laboratory to get a small blood pressure machine and to go over the plan for stopping your medicine. During the time that your medication is being stopped, you must check your blood pressure every day and keep a log of the blood pressure values. You will also be given information telling you how to safely stop your medication. During the time that your medication is being stopped, you will begin an American Heart Association diet (see below). If your systolic blood pressure (top number) goes to 160 mmHg or your diastolic blood pressure (lower number) goes to 100 mmHg, then you will immediately contact the investigators. If you must restart your blood pressure medication you cannot take part in this study. If this happens, a letter will be sent to your personal physician explaining that you should start your usual treatment for your blood pressure. Four weeks after your blood pressure medication has been stopped, you will visit the laboratory in the morning for a second screening visit. During this visit, you will have your blood pressure measured. If your systolic blood pressure is between 120 and 159 and your diastolic blood pressure is between 80 and 99, while you are not taking blood pressure medication, then you will qualify for the next phase of the screening.

During the second screening visit you will have a physical examination by Dr. Crabbe, an ECG (a way for the doctors to look at how your heart functions to see if it is healthy) and have your blood pressure measured after 15 min of seated quiet rest. In order to have this test, a technician will apply small sticky pads to the skin of your upper body. At the location where the sticky pads are placed, your skin will be rubbed with an alcohol pad. Next, you will have an exercise test to see if you have any signs of heart

disease. This test will be performed so that the investigators can be sure that the exercise program will be safe for your heart. During the exercise test, you will ride a bicycle and have pictures of your heart taken by echocardiography, sometimes called cardiac ultrasound. Echocardiography is one of the most commonly used tests for heart disease. It is non-invasive and involves placing a small wand on your chest. It uses sound waves to take pictures of the heart. The test will take place at the Cardiovascular Center in Temple University Hospital. The test will begin easy and the pedaling will get harder every three minutes. The total time for the bicycle is approximately 8-12 minutes. You can ask the technician to stop the test at any time if you become uncomfortable. During this exercise test, your blood pressure and heart will be monitored. At certain times during the test, a technician will ask you to point to a chart to indicate how difficult the exercise is feeling. A physician will be present during the test. You understand that, if the test shows that you might have heart disease you will be excluded from the study at this point and you will be asked to be seen by your personal doctor or arrangements will be made for you to be seen by a doctor at Temple University Hospital. The total amount of time for this visit is 1 hour.

Baseline testing

Diet Program: After the second screening visit, you will go to a dietary class once per week for 6 weeks to learn how to eat an American Heart Association (AHA) Diet. This diet is called a "Step 1" diet because it is the first step in eating foods that are healthy for your heart. At each diet class, your weight and blood pressure will be measured. If the diet is causing you to lose weight, you will be asked to increase your intake of healthy foods slightly. The staff will help you figure out ways to do this. The amount of salt in your diet will be measured at the end of the 1 month period by providing another urine sample.

Submaximal VO₂ test: VO₂ stands for the amount of oxygen that your body uses when you are resting or doing physical work. Before the test begins, you will have your resting metabolic rate (A measure of how many calories your body burns) measured during 20 minutes of quiet rest while lying down on a table. VO₂ will be measured continuously during the 20 minutes by placing a hard plastic covering around your head for 20 minutes. You will just relax and breathe normally. After 20 minutes of quiet breathing, you will be prepared for the exercise test. The investigators need to measure your VO₂ during exercise in order to plan your exercise program. During this test, you will walk on a treadmill and wear a clip on your nose and have a tube connected to a mouthpiece so that the air you breathe out during the test will go into a machine that will measure oxygen and carbon dioxide. This test will start at a medium walking speed and the hill of the treadmill will get steeper and the walking speed will get a little faster every 3 minutes. Your blood pressure, heart rate, and your heart tracing (ECG) will be monitored before, during, and after the treadmill test. The test will be stopped when you reach 75% of your maximal exercise capacity. You will have this test three times, once before starting the exercise program and after 3 and 6 months of being in the exercise

training program. The total amount of time that you will be on the treadmill is 8-12 minutes. The total amount of time for the visit is about 1 hour.

Psychosocial data collection: You will be asked to complete several written questionnaires about your perceptions of exercise and wellness, in order to explore how they may influence your motivation to exercise. These self-administered questionnaires will take 15-20 minutes to complete. There are no right or wrong answers. You do not need to answer any question you are uncomfortable with. You may also be asked to participate in a focus group during the study. The focus group is a group interview and will be comprised of 6-8 study participants. The focus group will last approximately 1-1.5 hours and will be led by two group leaders. They will ask questions about barriers and benefits to adhering to exercise and the “Step 1” diet. You do not need to answer any question you are uncomfortable with. The discussion from the focus group will be audio recorded and transcribed verbatim following the session. Your confidentiality will be maintained throughout all of the psychosocial data collection, and you will only be identified by your subject ID number. Audio recordings will be erased after the transcriptions are completed.

Ambulatory Blood Pressure Monitoring and Urine collection: Ambulatory blood pressure is the blood pressure in your body as you go about your regular day. On a separate day, you will begin a 24-hour blood pressure monitoring and urine collection period. This will happen on a day in which you have a normal schedule. You will visit Dr. Brown’s laboratory in the morning between 7:00 AM and 9:00 AM. Laboratory staff will give you all of the materials required to complete the 24-hour period. The urine collection period will begin immediately. You will be fitted with a blood pressure monitor that will measure your blood pressure during the next 24 hours. The blood pressure monitor is a small electronic device that can go under your clothes. The monitor is connected to a blood pressure cuff that goes around your upper arm just like when you have your blood pressure measured. The blood pressure monitor will measure your blood pressure every 30 minutes during your waking hours and every 60 minutes during your sleeping hours. You will have the monitor for 24 hours so this means that you will have it when you go home and even when you go to bed. You will be asked to not exercise before or during the day of blood pressure monitoring. This means that you will not do any exercise or other physical activities that you would not regularly do. If you are walking about at the time of a blood pressure measurement, then you will stop if it is safe and pause until the measurement is completed. For example, if you are walking across the street and the machine begins to measure your blood pressure, you should continue across the street and then find a place to stop for a few minutes. You will be given a log book so that you can write down what you are doing each time that your blood pressure is measured. You will be instructed to not remove the monitor except for bathing purposes, after which you will put the blood pressure monitor and cuff back on. Staff will show you how to take off and put on the blood pressure monitor and cuff. You will also be given the materials in order save all of your urine during the 24-hour period. 24-hours from the start of the blood pressure monitoring period you will give your last urine sample and remove the blood pressure cuff and turn off the monitor. This will end the 24-hour period. You will do have this test two times, once before and once after 6 the month exercise program.

Body composition and blood drawing: On the same day as the 24-hour ambulatory blood pressure monitoring and urine collection period, you will have your

body composition (the amount of fat muscle and bone) measured. This measurement will tell the investigators what percentage of your body is fat. The instrument that measures your body composition is called bioelectrical impedance (BIA). The machine will cause a very small electrical current to go through your body for 2-3 seconds. It is one of the most common ways to measure your body composition. People who join a gym to workout often have this done at the gym before they start their exercise program. To do this test, you will lie on a table on your back with your left foot exposed. You will have to take off your left shoe and sock or remove any stockings. A technician will place two sticky pads on your left foot and two sticky pads on your left hand. The day before this test, you will be told to not exercise, drink alcohol, or eat food that is more salty than what you eat in your regular diet. This will help the investigators and you to get the most accurate information.

After your body composition is measured you will have blood samples taken so that the investigators can measure how your body changes with exercise training. This will be done twice during the study; once before and once after the exercise training. The blood will be taken the same way as described above in the screening visit. A needle will be placed in your arm vein and 6 tubes of blood will be obtained. These blood samples will be used to measure chemicals in your blood that help the investigators to know more about your blood vessels and blood pressure. Approximately 1 ounce (2½ tablespoonfuls) of blood will be taken. You will have your body composition measured two times, once before and once after the month exercise program. You will have your blood taken three times, once before, mid-way through, and at the end of the 6 month exercise program.

Blood Vessel Function Testing: The blood vessels are the small hollow tubes that carry blood through your body. They are called arteries and veins. This test will be done at the Cardiology Section at Temple University Hospital after an overnight fast (12 hours) so that the investigators can measure how well the blood vessels in your arm work. The investigators use an ultrasound machine to take pictures of a blood vessel in your arm. If you are right-handed, the test will be done on your left arm. If you are left-handed then the test will be done on your right arm. You will be asked to not eat or drink food or liquid that has caffeine, alcohol, or pain medicines like aspirin, Advil, or Motrin, and not take any decongestants, cold or allergy medicines for the whole day before the study. You will lie down comfortably on a table. Following 20 minutes of quiet rest on the table, a blood sample (about 1½ tablespoons) will be taken. First, the doctor will put a gel (Similar to Vaseline) on your arm. The doctor will place a small device called a wand on your skin near your elbow and hold it still for several minutes while pictures are being taken.

Next, the same measurement will be made, but this time, it will happen after 5 minutes of stopping the blood flow going into your arm. To do this, the doctor will put a cuff around your arm. The cuff is just like the cuff that is put on your arm to measure your blood pressure. Just like when your blood pressure is measured, the cuff is pumped up until the blood stops going into your arm. This test is the same except that the cuff will stay pumped up for 5 minutes. Your hand may begin to feel “numb and tingly” similar to the feeling when your hand or foot falls asleep. When the air is let out of the cuff, the measurements with the ultrasound machine will be made for three minutes. During this time you will continue to lie down on the table in a comfortable position.

After a 10-15 minute rest period, the same test will be done again but this time it will be done after small amount of a substance called a nitroglycerine tablet is placed under your tongue. Nitroglycerine is a substance that causes your blood vessels to relax. It is most often used when people have chest pain due to heart disease. Nitroglycerine can also lower your blood pressure for a short time. Very rarely, it causes a mild headache that last for 5-10 minutes.

During the same visit, two blood vessels in your neck (carotid arteries) will be measured to find out the thickness of the blood vessel walls. The thickness of the blood vessel walls in your neck is sometimes related to the risk for cardiovascular disease. This test will be done using the same ultrasound machine that was used to measure the blood vessel in your arm. The doctor will place a small amount of gel on each side of your neck and then place a small wand on the skin. Pictures will be taken for 3-5 minutes. The total time for this visit to measure arm and neck blood vessels is approximately 1 ½ hours. You will have this test done two times during the study; once before and once after the exercise training.

On a separate day, you will visit Dr. Brown's laboratory in the Department of Kinesiology at Temple University to have your blood vessels measured using a different kind of machine. For this test, you will also lie down comfortably on a table after not eating for 12 hours. You should not eat foods or liquids that have caffeine or alcohol in them and you will be told not to take an pain relievers, decongestants, cold or allergy medicines for the whole day before the test. Measurements will be made after 20 minutes of quiet rest. During the rest time, the investigators will comfortably support your arm in an armrest and put a blood pressure cuff on your upper arm. A second smaller blood pressure cuff will be put around your wrist. Next, a very thin hollow rubber band filled with mercury, called a strain gauge will be placed around your forearm. The test will begin when the investigators pump up the cuff around your wrist. Your hand will start to fell numb. The cuff around your upper arm will then be pumped up only a little bit every 15 seconds. During this time, blood pressure will be measured in your other arm. After these measurements and a 15-minute rest period, the investigators will again do the test but this time it will be after 5 minutes of having the cuff inflated just like what was done in the other test. This is when the cuff on your arm is pumped up very high for 5 minutes. After the 5 minutes, the air is let out of the cuff and the measurements will begin again and last for 3 minutes. This entire visit will last approximately 1 hour. You will have this test done two times during the study; once before and once after the exercise training.

Exercise Training Program

After completing the Baseline Testing described above, you will begin an aerobic exercise training program for 6 months. Aerobic exercise is physical exercise that uses large muscles like the legs and is continuous meaning is done for 20 minutes or more. It is not exercise like lifting weights. Aerobic exercise is the kind of exercise that doctors say will help to lower blood pressure, lower cholesterol levels, and lower the chances of getting diabetes. Examples of aerobic exercise are fast walking and bicycling. You will visit the exercise facility in the Department of Kinesiology at Temple University 3 times per week. Study personnel will supervise all exercise sessions. You will learn how to measure your heart rate and to use heart rate monitors so that you will know how hard you are exercising. At your first exercise session, you will exercise for 15-20 minutes at the lowest level of difficulty. As you get in better shape, the amount of exercise you do will increase gradually until you are exercising for 40 minutes of moderate intensity

exercise every session. The investigators do not want you to exercise as hard as you can because they know that lower levels of exercise are most healthy, They call this level of exercise “moderate intensity”. You will be able to choose from different exercise machines. Exercise sessions will last between 40 and 60 minutes.

Final Testing

After you finish the 6 month exercise program, you will have everything re-tested in the same order as the testing that occurred during Baseline Testing. In addition, you will have the treadmill exercise test to measure your fitness level after the exercise training program. These final tests will happen 36-48 hours after one of your regular exercise sessions.

The total number of times that you will be stuck with a needle during the entire study is 4 (once during screening, once during baseline testing, one mid-way through the exercise program, and once during final testing). The total amount of blood that will be taken from your arm during the entire study is about 12 tablespoons over the 9-10 month period that you participate in the study.

Possible risks related to participation in this research study

The following risks, although low, are related to your participation in this research study.

Exercise testing: During the study, there are times when you will do a treadmill test that requires you to exercise as hard as you can. These tests are called maximal exercise tests. This is not the same as the exercise training in which you exercise 3 times a week. The risk of a maximal exercise test is that out of 10,000 tests, someone has a medical problem. In 1 out of every 70,000 exercise tests, a person will die from heart problems. In medical terms, doctors call this a rare event. The investigators will make sure it is as safe as possible for you to do this test because you will already have had tests including blood tests and a physical examination that will help the doctor to find out whether you are healthy enough to perform maximal exercise. Also, a doctor will be present when you do the test.

Giving blood: The research staff will take your blood in exactly the same way as when you have your blood taken at the doctor’s office. There is a small risk of bruising and rarely infection. These risks will be lowered by using sterile procedures and by having trained research staff take all blood samples. There is also some pain associated with needle sticks and sometimes, people have been known to faint during needle sticks and blood drawing. We will take your blood while you are lying down which helps to prevent fainting.

Stopping your blood pressure medicine: The risks are that your blood pressure could increase to unsafe levels (greater than 180/120). Unsafe levels of blood pressure can lead to headache, stroke, chest pain, heart attack and damage organs such as the kidneys and heart. These types of very high blood pressure emergencies are rare. Many doctors that treat high blood pressure feel that it is a good idea to reduce medicine once a year to see if the amount of medicine can be lowered. The investigators will only talk to you about stopping your medication if your blood pressure is not higher than

130/85 while you are taking your medicine. Your risk will be reduced because during this time you will also be changing your diet which may help to lower your blood pressure. In addition, the study doctor will check you as you begin to slowly stop your medicine. In order to help the study doctor make sure it is safe for you to stop your blood pressure medicine, the investigators will give you a blood pressure monitor to take home. The investigators will show you how to measure your blood pressure during the day. You will keep a log of your blood pressure numbers and report it to the investigators. If your blood pressure increases to more than 160/100, then the investigators will tell you to resume your medicine.

Measuring your body composition: There are no known risks of having the amount of fat measured in your body. There are no needles and no pain. Sticky pads are placed on your foot and hand. The test takes about 5 minutes.

Measuring Blood Vessel Function: The blood vessels are the small hollow tubes that carry the blood in your body. The risk of these tests is the minor discomfort you will feel when the blood pressure cuff is pumped up because it will cause the blood to stop going into your arm and hand and this will happen for 5 minutes. There are no procedures to lower the chances of having this discomfort. This discomfort is the same as when your foot falls asleep. There are no known risks of having ultrasound. During part of the test, a small nitroglycerine tablet will be placed under your tongue. Nitroglycerine can sometimes lower your blood pressure and sometimes cause a headache for 5-10 minutes. Your blood pressure will be prevented from going lower because you will be lying on a table. A Cardiologist will be performing the test and will monitor you during the entire visit.

Psychosocial measures: There are no foreseeable risks in participation in this portion of the research study.

Measuring your ambulatory blood pressure: You will be wearing a small device that will measure your blood pressure during a regular day. When the blood pressure monitor pumps up the cuff, it is possible to hear the sound of the pump when you are in a quiet place. About 2 out of 100 people say that they have woken up during the night. These people also say that they are light sleepers. At night, the machine will measure your blood pressure 1 time every hour. There are no procedures to lower the chances that the blood pressure machine might wake you while you are sleeping. The investigators will show you ways that might help so that this does not happen.

Exercise training: The risk of exercise training is that it is possible to have a medical problem usually related to your heart. Out of every 375,000 hours of exercise training there are 2 times in which a person has a medical problem. This is the same as 1 medical problem for every 1.7 million miles of walking. These risks will be lowered because you will have a physical examination and an exercise test to make sure it is safe for you to train. There will also be trained staff that knows how to handle medical problems if it happens during an exercise training session.

Genetic Testing: As part of the study, the investigators will be analyzing your DNA to see if it gives them information about how your blood vessels work and how your blood vessels and blood pressure are affected by exercise. DNA is the material in your body that is passed on from parent to child and from generation to generation. The investigators will get your DNA during one of the times that they take your blood at the start of the study. The risks of having your blood taken have already been described above. The risk of genetics testing is finding out that you have a gene that shows that

you may have a higher risk for getting a disease in the future. These risks are low because the places in your DNA that the investigators are looking at do not tell them if you will or will not get cardiovascular disease in the future.

Since there may be unknown risks to pregnant women and their unborn child, if you are nursing, pregnant, or planning to become pregnant, you will not be allowed to participate in this research study.

You confirm to the best of your knowledge that you are not pregnant and if you become pregnant during the course of this study, you must notify your physician and the investigators immediately.

Possible benefits of participating in this study

It is well known that African Americans suffer more from high blood pressure (hypertension) compared to other populations in the United States. There are direct benefits to you as a result of your participation in this study. Some of these benefits are greater than those you would have from usual medical testing. For example, 24-hour ambulatory blood pressure monitoring, dietary counseling, exercise testing, cardiac ultrasound, and supervised exercise training are not usual medical practice procedures. You will benefit from the medical and cardiovascular testing, measurement of your cholesterol and glucose. Most experts think that exercise is usually good for your overall health. The benefits of aerobic exercise training on risk factors for cardiovascular disease are well known. When blood pressure is lowered, it lowers your chances of getting heart disease and having a stroke. Even when blood pressure is not lowered with exercise training, healthy changes in body composition, cholesterol, and glucose and insulin almost always happen. You will also benefit from the diet. This diet is the first step to a low fat/low salt diet that is healthy for your heart. The benefits of a lower fat and salt diet are also well known. It is the investigator's hope that the exercise becomes an enjoyable experience and that you will enjoy exercising with others who share many of the same health and fitness goals as you do. The benefits of dietary counseling and exercise training have been shown in large studies involving many participants. Whether these benefits will occur in you cannot be guaranteed.

Alternative Treatments

Alternative treatments to aerobic exercise training are very limited. Of course, under your physician's direction, there is the option of increasing your medications to control your blood pressure. This may be the case even if exercise does lower your blood pressure. However, blood pressure medicine cannot do all of the things that aerobic exercise can. All of the side effects of aerobic exercise training in terms of health are beneficial. There are other treatments that do not use medication. Lowering the amount of salt in your diet and reducing your body weight if you are overweight may help to lower your blood pressure too. As with exercise, these treatments may not be effective for every person, and, each person may respond differently to them. You

should always ask your doctor before you start any of these ways to help treat your blood pressure. You also have the choice to not participate in this study.

Confidentiality Statement

All documents and information about to this study will be kept confidential in accordance with federal, state, and local laws and regulations. You understand that medical records and data generated by the study may be reviewed by Temple University's Institutional Review Board, the Office for Human Research Protections, and the National Institutes of Health to assure proper conduct of the study and compliance with federal regulations. You understand that the results of this study may be published. If results are published, you will not be identified by name.

Voluntary Participation Statement

You understand that participation in this study is entirely voluntary, and that refusal to participate will involve no penalty or loss of benefits to you. You may discontinue your participation at any time without penalty or loss of benefits.

Compensation Statement

You understand that you will receive \$150 if you complete this study and attend at least 90% of the exercise training sessions. You understand that you will receive \$50 if you complete the baseline testing, an additional \$50 if you complete the exercise training with at least 90% attendance, and an additional \$50 if you complete the final testing. You will receive compensation for your participation in the form of cash at the end of the study. If you do not complete the entire study you will receive partial compensation for those parts of the study you do complete.

Institutional Contact

If you have questions about your rights as a research participant, you may contact the Institutional Review Board Coordinator at (215) 707-3390. The IRB Coordinator may also be reached by email: IRB@temple.edu or regular mail:

Institutional Review Board Coordinator
Temple University Research Administration
Student Faculty Conference Center
3340 North Board Street – Suite 304
Philadelphia, PA 19140

If you have questions about research-related injuries, you may contact the Principal Investigator, Dr. Michael Brown, in the Department of Kinesiology at (215) 204-5218.

Standard Injury Statement

You understand that if you sustain an injury as a result of participation in this study, the physician's fees and medical expenses that result will be billed to your insurance company or you in the usual manner. You understand that financial compensation for

such injuries is not available. You understand that you have not waived any legal rights that you would otherwise have as a participant in an investigational study.

Costs Statement

You understand that any doctor's fees, medical tests, or other tests associated with this study will be provided at no cost to you. You understand that you are responsible for transportation to the study site and parking.

Termination Statement

The investigators have the right to terminate your participation without regard to the your consent. This could occur if you cannot make your appointments, miss more than 10% of your exercise sessions, or experience a change in your medical condition during the course of the study.

Statement of Significant New Findings

You will be informed in a timely manner of any new information regarding this study that may have an affect on your willingness to participate, continue your participation, or after your participation that may have an affect on your future medical care. You may be asked to sign a revised informed consent that contains this new information.

Final Statement and Signature

This study has been explained to me, I have read the consent form and I agree to participate. I have been given a copy of this consent form.

Participant's signature

Date

Principal Investigator's signature

Date

Witness's signature

Date

Timeline	Visit	Procedure	Required
Month 1	<i>Orientation Visit</i>	<ol style="list-style-type: none"> 1. Review medical history questionnaire, informed consent 2. Blood pressure taken. 	1 hour time
Month 1	<i>Before Screening Visit 1</i>	12 hour overnight fast evening before screening visit 1	12 hours intake monitoring
Month 1	<i>Screening Visit 1</i>	<ol style="list-style-type: none"> 1. Blood and urine sample drawn 2. Blood pressure taken. 	1 hour time
Month 1	<i>Screening Visit 2</i>	Physical exam and exercise stress echo test	1 ½ hours time
Month 2	<i>Dietary Stabilization Period</i>	<ol style="list-style-type: none"> 1. Learn and maintain AHA diet. 2. Complete food records. 3. Meet 1 session/week for 6 weeks 	<ol style="list-style-type: none"> 1. Monitor and maintain dietary intake. 2. Attend 2 dietary sessions a week for 4 wks
Month 2	<i>Before Baseline Testing</i>	12 hour overnight fast evening before first visit.	12 hours intake monitoring
Month 2	<i>Baseline Testing</i>	<ol style="list-style-type: none"> 1. Blood samples 2. Body composition tested. 3. Blood pressure taken. 4. Blood vessel function tests 5. 24 hour urine and BP collection. 6. Submaximal treadmill test to measure fitness level 	<p><i>Several visits:</i></p> <ol style="list-style-type: none"> 1. 1 ½ hours: Collection of blood, urine, blood pressure. 2. Body comp. taken and take home supplies for 24 hour collection. 3. After 24 hour collection, drop off supplies and samples. 4. 1 ½ hours for blood vessel function testing
Months 3-8	<i>Exercise Training</i>	Supervised exercise training sessions:	3 sessions a week for 6 months

Month 9	<i>Before Final Testing</i>	12 hour overnight fast evening before first visit of final testing.	12 hours intake monitoring
Month 9	<i>Final Testing</i>	Repeat Baseline Testing	Same as baseline testing

APPENDIX B
RECRUITMENT SCRIPT

Hello from the Fit 4 Life Study! My name is Amanda Perkins, and I am a doctoral student and part of the Fit 4 Life research team. As you may know, a limited amount of research has been conducted on African Americans in exercise and disease prevention, and we are continuing our efforts to do so. I am currently conducting research to explore various factors that influence individuals' exercise participation, such as previous physical activity experiences, family and cultural influences, and attitudes toward exercise. I am interviewing people who participated in the Fit 4 Life Study to get their insight on the process of beginning and maintaining an exercise program. The interview will last about 1 hour, and will be conducted in a private setting. Just as in previous parts of the Fit 4 Life Study, your identity will be kept confidential. We hope to use this information gained from these interviews to make the Fit 4 Life study, as well as similar interventions, more effective. Would you be interested in participating in an interview? We can schedule them at a convenient time and location for you.

APPENDIX C
CONSENT FORM

Title of research study: Influence of Demographic, Psychosocial, Physiological and Sociocultural Variables on Exercise Adherence among African Americans Enrolled in the Fit 4 Life Study

Investigator and Department: Michael L. Sachs, PhD, Department of Kinesiology
Amanda M. Perkins, MEd, Department of Kinesiology

Why you are being invited to take part in a research study

We invite you to take part in a research study because you were previously enrolled in, and completed the baseline testing procedures, for the Fit 4 Life Study at Temple University.

What you should know about a research study

- Someone will explain this research study to you.
- You volunteer to be in a research study.
- Whether you take part is up to you.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide, it will not be held against you.
- Feel free to ask all the questions you want before and after you decide.

Who can I talk to?

If you have questions, concerns, or complaints, or think the research has hurt you, contact the research team at Fit 4 Life Study, Temple University, Department of Kinesiology, 1800 N. Broad St., Philadelphia, PA 19122, amanda.perkins@temple.edu, 215-204-6216.

This research has been reviewed and approved by an Institutional Review Board. You may talk to them at (215) 707-3390 or e-mail them at: irb@temple.edu for any of the following:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

Why are we doing this research?

The purpose of this study is two-fold. The first purpose is to examine patterns of adherence among participants in the Fit 4 Life study and describe the relationship between demographic, psychosocial, sociocultural and physiological characteristics and exercise adherence. Secondly, we will explore follow-up behaviors of participants previously enrolled in the Fit 4 Life study. This study seeks to gain a comprehensive understanding of the process of beginning and maintaining an exercise program among

participants, which has the potential to make the Fit 4 Life study, as well as similar interventions, more effective, and ultimately diminish chronic health disparities related to physical inactivity.

How long will the research last?

We expect that you will be in this research study for about 1 hour.

How many people will be studied?

We expect about 10 people will be in this research study, out of 75 people who completed baseline for the Fit 4 Life research study.

What happens if I say yes, I want to be in this research?

The student researcher, Amanda M. Perkins, will contact you via telephone to schedule an in-person interview. Interviews will be scheduled at a convenient time and location for both you and the researcher. The student researcher will conduct all of the interviews in a private room in the Fit 4 Life office. You will only be identified by your Fit 4 Life identification number that was previously assigned to you. The interview will last about 1 hour, and will address your previous experiences with physical activity, the physical activity experiences of your friends and family, and your experience participating in the Fit 4 Life exercise program. You do not have to answer any question you are not comfortable answering, and you can end the interview at any time and it will not be held against you. Interviews will be recorded on an Olympus VN-7600PC digital voice recorder. Only the student researcher and her advisor will have access to the interview recording. The audio recording will be kept in a password protected file on the researcher's office computer in the Fit 4 Life lab office, and will be erased 6 months after the completion of the study. The student researcher will then type out the interview and you will receive a copy of the transcript to review. The student researcher, her advisor, and another member of the research team will have access the transcript, and will look at it.

What happens if I say no, I do not want to be in this research?

You may decide not to take part in the research and it will not be held against you. It will in no way affect your relationship with the researcher.

What happens if I say yes, but I change my mind later?

You agree to take part in the research now and if you stop at any time, it will not be held against you. Again, it will in no way affect your relationship with the study doctor.

What happens to the information we collect?

Efforts will be made to limit your personal information, including research study and medical records, to people who have a need to review this information. We cannot promise complete secrecy. For example, though the study team has put in safeguards to protect your information, there is always a potential risk of loss of confidentiality. Organizations that may inspect and copy your information include the IRB, Temple University, Temple University Health System, Inc. and its affiliates, and other representatives of these organizations, and the Office of Human Research Protections.

We may publish the results of this research. However, we will keep your name and other identifying information confidential.

Can I be removed from the research without my permission?

The person in charge of the research study or the sponsor can remove you from the research study without your approval. Possible reasons for removal include failure to follow instruction of the research staff. The sponsor can also end the research study early.

We will tell you about any new information that may affect your health, welfare, or choice to stay in the research.

Participating in Future Research Studies

We may want to contact you in the future to see if you would be interested in participating in another research study and/or to obtain additional information related to your participation in this study. Please indicate by initialing on the line in the next paragraph below if you are willing to be contacted. Please know that you can amend your answer below at any time without prejudice to you or your relationship with the study, Temple University, or the Study doctor and team.

Yes, I agree to be contacted about future research studies. ____

No, I do not want to be contacted about future research studies. ____

Yes, I agree to be contacted to obtain additional information related to my participation in this study. ____

No, I do not want to be contacted to obtain additional information related to my participation in this study. ____

Signature Block for Capable Adult

Your signature documents your permission to take part in this research.

DO NOT SIGN THIS FORM AFTER THIS DATE →

Signature of subject

Date

Printed name of subject

Signature of person obtaining consent

Printed name of person obtaining consent

APPENDIX D
COVER LETTER

Dear _____,

Hello from the Fit 4 Life Study! We hope this letter finds you in good health and good spirits! As you may know, a limited amount of research has been conducted on African Americans in exercise and disease prevention, and we are continuing our efforts to do so.

We are now in the process of collecting additional information from our participants who completed baseline testing for our study. Attached to this letter you will find 5 short questionnaires we are asking you to complete. Your responses will help us identify important information, such as reasons why people exercise, barriers they may face regarding exercise, and how they feel exercise influences their overall health.

Your answers are important to us. The insight we gain from your answers will help us not only in our mission to conduct research in this area, but also to develop interventions that successfully address the needs of the community.

Your responses will be kept confidential. You do not need to put your name on any page, only your FIT ID #. (If you don't remember your FIT ID# please write your initials.) *The entire packet should take 15 – 20 minutes to complete.* After you complete the packet, please return it to us in the *self-addressed envelope enclosed*.

To say thank you, everyone who completes and returns the surveys will receive a \$15.00 Visa gift card.

Each survey has its individual instructions located at the top of the page. Please call us anytime if you have questions regarding the survey. You can call the main study office at 215-204-0084. Thank you for your continued support and your contribution to research.

Regards,

Dr. Michael Brown, Principal Investigator
Jan Kretzschmar, Study Coordinator
& the HyMAP staff

APPENDIX E
AEROBIC EXERCISE TRAINING PROGRAM

Exercise Heart Rate Goals

	Intensity (VO_{2max} %)	Heart Rate Goal	Duration (total minutes)
Week 1	50%		20 min.
Week 2	50%		25 min.
Week 3	50%		30 min.
Week 4	50%		35 min.
Week 5	50%		40 min.
Week 6	55%		40 min.
Week 7	60%		40 min.
Week 8	65%		40 min.
Week 9	65%		40 min.
Week 10	65%		40 min.
Week 11	65%		40 min.
Week 12	65%		40 min.
Week 13	65%		40 min.
Week 14	65%		40 min.
Week 15	65%		40 min.
Week 16	65%		40 min.
Week 17	65%		40 min.
Week 18	65%		40 min.
Week 19	65%		40 min.
Week 20	65%		40 min.
Week 21	65%		40 min.
Week 22	65%		40 min.
Week 23	65%		40 min.
Week 24	65%		40 min.

APPENDIX F
DEMOGRAPHIC QUESTIONNAIRE

FIT ID #: _____ Today's Date: ____/____/____

Name: _____

Date of Birth: ____/____/____ Age: _____

Gender: M F

Height: _____ Weight: _____

Level of Education (please circle one):

HS Diploma/GED	Associate's Degree
Bachelor's Degree	Master's Degree
Doctorate/Professional Degree	Other

Marital Status (please circle one):

Single	Married	Living with another
Separated	Divorced	Widowed

Employment Status (please circle one):

Full-time	Part-time
Not employed	Retired

Current Occupation: _____

Time at Current Occupation: _____ years

Household Income (please check one):

_____ \$0 - \$14,999	_____ \$15,000 - \$29,999
_____ \$30,000 - \$49,999	_____ \$50,000 - \$74,999
_____ \$75,000 - \$99,999	_____ \$100,000 +
_____ Prefer not to answer	

How many people are currently living in your household?
(Please include yourself) _____

Caregiving Responsibility:

Child(ren) # _____ ages _____ Years Providing Care _____

Grandchildren

_____ ages _____ Years Providing Care _____

Parent(s) # _____ ages _____ Years Providing Care _____

Sibling(s) # _____ ages _____ Years Providing Care _____

Other(s) # _____ ages _____ Years Providing Care _____

Exercise is defined as any *planned* physical activity (e.g., brisk walking, aerobics, bicycling, swimming) performed to increased physical fitness, which is performed at least 3 times per week. Do you currently exercise? (circle one)

Yes No

If no, when is the last time you exercised regularly?

Please briefly describe your previous sport/exercise participation:

Childhood/Youth:

Young Adult/College:

Adulthood:

APPENDIX G
EXERCISE STAGES OF CHANGE - SHORT FORM
(Norman et al., 1998)

FIT ID # _____

Exercise: Stages of Change - Short Form

Regular Exercise is any *planned* physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed *3 to 5 times* per week for *20-60 minutes* per session. Exercise does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat.

Question:

Do you exercise regularly according to that definition?
(check one)

- _____ Yes, I have been for MORE than 6 months.
- _____ Yes, I have been for LESS than 6 months.
- _____ No, but I intend to in the next 30 days.
- _____ No, but I intend to in the next 6 months.
- _____ No, and I do NOT intend to in the next 6 months.

APPENDIX H
EXERCISE BENEFITS/BARRIERS SCALE
(Sechrist et al., 1985)

FIT ID # _____

DIRECTIONS: Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements by circling SA for strongly agree, A for agree, D for disagree or SD for strongly disagree.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. I enjoy exercise.	SA	A	D	SD
2. Exercise decreases feeling of stress and tension for me.	SA	A	D	SD
3. Exercise improves my mental health.	SA	A	D	SD
4. Exercising takes too much of my time.	SA	A	D	SD
5. I will prevent heart attacks by exercising.	SA	A	D	SD
6. Exercise tires me.	SA	A	D	SD
7. Exercise increases my muscle strength	SA	A	D	SD
8. Exercise gives me a sense of personal accomplishment.	SA	A	D	SD
9. Places for me to exercise are too far away.	SA	A	D	SD
10. Exercise makes me feel relaxed.	SA	A	D	SD
11. Exercising lets me have contact with friends and	SA	A	D	SD
12. I am too embarrassed to exercise.	SA	A	D	SD
13. Exercising will keep me from having high blood	SA	A	D	SD
14. It costs too much money to exercise.	SA	A	D	SD
15. Exercising increases my level of physical fitness.	SA	A	D	SD
16. Exercise facilities do not have convenient schedules for	SA	A	D	SD
17. My muscle tone is improved with exercise.	SA	A	D	SD
18. Exercising improves functioning of my cardiovascular	SA	A	D	SD
19. I am fatigued by exercise.	SA	A	D	SD
20. I have improved feelings of well being from exercise.	SA	A	D	SD
21. My spouse (or significant other) does not encourage	SA	A	D	SD
22. Exercise increases my stamina.	SA	A	D	SD
23. Exercise improves my flexibility.	SA	A	D	SD
24. Exercise takes too much time from family relationships.	SA	A	D	SD
25. My disposition is improved by exercise.	SA	A	D	SD
26. Exercising helps me sleep better at night.	SA	A	D	SD

	Strongly Agree	Agree	Disagree	Strongly Disagree
27. I will live longer if I exercise.	SA	A	D	SD
28. I think people in exercise clothes look funny.	SA	A	D	SD
29. Exercise helps me decrease fatigue.	SA	A	D	SD
30. Exercising is a good way for me to meet people.	SA	A	D	SD
31. My physical appearance is improved by exercising.	SA	A	D	SD
32. Exercise improves my self-concept.	SA	A	D	SD
33. My family members do not encourage me to exercise.	SA	A	D	SD
34. Exercising increases my mental alertness.	SA	A	D	SD
35. Exercise allows me to carry out normal activities	SA	A	D	SD
36. Exercise improves the quality of my work.	SA	A	D	SD
37. Exercise takes too much time from my family	SA	A	D	SD
38. Exercise is good entertainment for me.	SA	A	D	SD
39. Exercise increases my acceptance by others.	SA	A	D	SD
40. Exercise is hard work for me.	SA	A	D	SD
41. Exercise improves overall body functioning for me.	SA	A	D	SD
42. There are too few places for me to exercise.	SA	A	D	SD
43. Exercise improves the way my body works.	SA	A	D	SD

K. Sechrist, S. Walker, N. Pender, 1985. Reproduction without authors' express written consent is not permitted. Permission to use this scale may be obtained from: Dr. Karen Sechrist, Berlin Sechrist Associates, 18 Morningstar, Irvine, CA 92603-3745; e-mail, krsech@pacbell.net.

APPENDIX I
BARRIERS SELF-EFFICACY SCALE
(McAuley, 1992)

The following items reflect situations that are listed as common reasons for preventing individuals from participating in exercise sessions or, in some cases, dropping out. Using the scales below please indicate how confident you are that you could exercise in the event that any of the following circumstances were to occur.

Please indicate the degree to which you are confident that you could exercise in the event that any of the following circumstances were to occur by circling the appropriate %. Select the response that most closely matches your own, remembering that there are no right or wrong answers.

For example, in question #1 if you have complete confidence that you could exercise even if "the weather was very bad," you would circle 100%. If, however, you had no confidence at all that you could exercise, if you failed to make or continue making progress (that is, confidence you would not exercise), you would circle 0%.

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NOT AT ALL CONFIDENT			MODERATELY CONFIDENT				HIGHLY CONFIDENT			

Mark your answer by circling a %.

I BELIEVE I COULD EXERCISE 3 TIMES PER WEEK FOR THE NEXT 3 MONTHS IF:										
1	The weather was very bad (hot, humid, rainy, cold).									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
2	I was bored with the program or activity.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3	I was on vacation.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
4	I was not interested in the activity.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
5	I felt pain or discomfort when exercising.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
6	I had to exercise alone.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
7	It was not fun or enjoyable.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NOT AT ALL CONFIDENT			MODERATELY CONFIDENT				HIGHLY CONFIDENT			

Mark your answer by circling a %.

8	It became difficult to get to the exercise location.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
9	I didn't like the particular activity program that I was involved in.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
10	My schedule conflicted with my exercise session.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
11	I felt self-conscious about my appearance when I exercised.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
12	An instructor/staff member does not offer me any encouragement.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
13	I was under personal stress of some kind.									
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Thank you for taking part in our research.

APPENDIX J
MULTIDIMENSIONAL HEALTH LOCUS OF CONTROL SCALE – FORM C
(Wallston, Stein, & Smith, 1994)

FIT ID # _____

INSTRUCTIONS: Each item below is a belief statement about your health with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with that statement. The more you agree with a statement, the higher will be the number you circle. The more you disagree with a statement, the lower will be the number you circle. Please make sure that you answer **EVERY ITEM** and that you circle **ONLY ONE** number per item. This is a measure of your personal beliefs; obviously, there is no right or wrong answers.

1=STRONGLY DISAGREE (SD)	4=SLIGHTLY AGREE (A)
2=MODERATELY DISAGREE (MD)	5=MODERATELY AGREE (MA)
3=SLIGHTLY DISAGREE (SD)	6=STRONGLY AGREE (SA)

		SD	MD	D	A	MA	SA
1	If my health worsens, it's my own behavior which determines how soon I will feel better again.	1	2	3	4	5	6
2	As to my health, what will be will be.	1	2	3	4	5	6
3	If I see my doctor regularly, I am less likely to have problems with my health.	1	2	3	4	5	6
4	Most things that affect my health happen to me by chance.	1	2	3	4	5	6
5	Whenever my health worsens, I should consult a medically trained professional.	1	2	3	4	5	6
6	I am directly responsible for my health getting better or worse.	1	2	3	4	5	6
7	Other people play a big role in whether my health improves, stays the same, or gets worse.	1	2	3	4	5	6
8	Whatever goes wrong with my health is my own fault.	1	2	3	4	5	6
9	Luck plays a big part in determining how my health improves.	1	2	3	4	5	6
10	In order for my health to improve, it is up to other people to see that the right things happen.	1	2	3	4	5	6
11	Whatever improvement occurs with my health is largely a matter of good fortune.	1	2	3	4	5	6
12	The main thing that affects my health is what I myself do.	1	2	3	4	5	6
13	I deserve the credit when my health improves and the blame when it gets worse.	1	2	3	4	5	6
14	Following doctor's orders to the letter is the best way to keep my health from getting any worse.	1	2	3	4	5	6

15	If my health worsens, it's a matter of fate.	1	2	3	4	5	6
16	If I am lucky, my health will get better.	1	2	3	4	5	6
17	If my health takes a turn for the worse, it is because I have not been taking proper care of myself.	1	2	3	4	5	6
18	The type of help I receive from other people determines how soon my health improves.	1	2	3	4	5	6

APPENDIX K
Satisfaction with Life Scale
(Deiner et al., 1985)

FIT ID # _____

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

____ In most ways my life is close to my ideal.

____ The conditions of my life are excellent.

____ I am satisfied with my life.

____ So far I have gotten the important things I want in life.

____ If I could live my life over, I would change almost nothing.

APPENDIX L
INTERVIEW GUIDE

I'm trying to learn about various factors that influence decisions people make regarding exercise, and what makes them exercise and what makes them refrain from or discontinue exercise. I'm especially interested in how you feel being African American does or doesn't influence exercise behavior. There are no right or wrong answers, and your responses will be kept confidential. If you don't want to answer a question, or if you would like to stop at any time, please let me know. Do you have any questions before we begin? I'll begin recording now.

Demographic

1. Can you tell me about yourself (e.g., age, family, where you live, your job, hobbies)?
2. What prompted you to enroll in the Fit 4 Life study?
3. Can you tell me about your experiences with exercise and physical activity prior to enrolling in the study?
 - a. Childhood?
 - b. Young adulthood/adulthood?
4. What does being African American mean to you?

Cultural Factors

5. What are some characteristics that you believe make your culture unique?
6. In what ways does your culture facilitate your being healthy?
7. In what ways does your culture hinder your being healthy?
8. In what ways do you friend and family participate in exercise/physical activity?

Facilitators

9. What do you believe are some of the short-term benefits of exercising?

10. What do you believe are some of the long-term benefits of exercising?
11. What do you believe will happen if you don't exercise regularly?
12. How do you feel exercise contributes (or could contribute) to your overall health?
13. What strategies did you use to help you stick with the program?
OR What strategies do you think you could have adopted to help you stick with the program?

Barriers

14. What do you believe are some of the barriers people experience regarding exercise?
 - a. Why didn't you exercise regularly before enrolling in the Fit 4 Life study?
15. What challenges did you face adhering to the exercise program?

Follow up

16. Has your attitude toward exercise changed from the time you enrolled in the study? If so, how?
17. Do you currently exercise? Why or why not?

"All things considered"

18. Could you describe features of an exercise program that would best meet your needs?
 - a. Are there any other needs that you feel others may share?
 - b. Outside of Fit 4 Life, do you have any ideas how these needs can be addressed in the community (outside of this study)?
19. If you could share one thing you've learned during your time enrolled in the study with your family/friends/community, what would it be?

20. Are there any other ideas or issues you feel are relevant to the discussion?

APPENDIX M
RAW DATA THEME COUNTS FOR ADHERERS AND NON-ADHERERS

BENEFITS

Raw Data Themes	Adherers	Non-adherers	Total
Depression	2	0	2
Stress relief	4	1	5
Energy	3	3	6
Sleep	2	1	3
Feel better	3	3	6
Social aspect	4	0	4
Focus	0	3	3
Quality of life	2	2	4
Self-esteem	2	1	3
Self-efficacy	6	1	7
Bone density	2	1	3
Strength	2	2	4
Blood pressure	6	1	7
Mobility	1	1	2
Weight	7	1	8
Eat better	1	1	2
Live longer	2	1	3
Diabetes	3	0	3
Cholesterol	2	1	3
Cancer	1	0	1
Stamina	2	1	3
Heart	3	2	5

BARRIERS

Raw Data Themes	Adherers	Non-adherers	Total
Care giving	3	1	4
Sedentary friends/family	5	4	9
Job	4	2	6
Injury	1	1	2
Family illness	1	0	1
Motivation (Personal)	0	2	2
Accessibility	2	1	3
Motivation (Community)	2	3	5
Knowledge/expectations	5	6	11
Media	2	1	3
Time/convenience (Community)	4	2	5
Money	3	0	3
Perception of others	2	0	2
Injury/disability	1	1	2
Priorities	2	2	4
Present time orientation	2	2	4
Food preparation/choice	7	7	19
Norm of poor health	3	0	3
Hair	0	1	1
Illness	2	0	2
Soreness	1	0	1
Exercise prescription	4	1	5
Time/convenience (Study)	2	4	6
Weather	0	1	1
Injury	0	1	1

FACILITATORS

Raw Data Themes	Adherers	Non-adherers	Total
Enjoyment	2	4	6
Routine	3	0	3
Guilt	1	1	2
Previous experience	7	4	11
Exercise in morning	4	1	5
Lifestyle physical activity	3	2	5
Goals	1	1	2
Focus on self	5	0	5
Health	4	3	7
Peer support	3	0	3
Staff	4	1	4
Commitment to study	2	1	3
Treatment efficacy	2	0	2
Affirmations	3	0	3
Self-efficacy	4	1	5
Time management	2	1	3

AFRICAN AMERICAN

Raw Data Themes	Adherers	Non-adherers	Total
Discrimination/racism	3	2	5
Scrutiny	4	1	5
Joy for life	1	1	2
Altruism	2	3	5
Family-oriented	2	0	2
Work hard	3	2	5
Physicality	2	0	2
Resilience/perseverance	4	4	8
Pride	3	4	7
Food preparation/choice	7	7	14
Ancestral influence	2	3	5
African American health	3	1	4
Access to healthy food	2	1	3
Go to community	2	1	3
Health fairs	0	1	1
Word of mouth	1	1	2
Churches	1	2	3
Education/disease knowledge	2	1	3
Incentives	3	1	4
"Exercise"	0	4	4
Transportation	0	1	1