Applying the Health Action Process Approach Model to Predict
Physical Activity in African Americans Living with HIV/AIDS:

A Hierarchical Regression Analysis

By

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ABSTRACT

The purpose of this study was to examine the predictive ability of Schwarzer’s Health Action Process Approach (HAPA) framework as a physical activity/exercise model for African Americans with HIV/AIDS. One hundred and ten participants were recruited from 3 HIV case management agencies in Baton Rouge, LA. They completed a health promotion survey including a demographic questionnaire and brief instruments operationalizing the constructs of the HAPA model. Data were analyzed using correlational analysis and multiple regression. The findings of this study support the use of Schwarzer’s HAPA model in predicting physical activity/exercise behavior for African Americans with HIV/AIDS. The model accounts for 35% of the variance in physical activity/exercise behavior scores. Of the predictor variables, the most significant variables were symptom severity, outcome expectancy, and action and coping planning. A mediational analysis revealed action and coping planning partially mediated the relationship between physical activity/exercise intention and behavior. Other variables in the HAPA model, such as action self-efficacy, recovery self-efficacy, and social support were found to correlate with physical activity/exercise behavior scores, but their effects were mediated by other predictor variables in the model, mainly symptom severity, intention, and action and coping planning. Thus, the results of this study provide partial support for the validation of this model for predicting physical activity/exercise participation in African Americans with HIV/AIDS.
CHAPTER ONE

Introduction

Health care costs in the United States have been rising sharply for several years and reached $2.6 trillion in 2010 (Martin, Lassman, Whittle, & Catlin, 2011). By 2020, economists estimate this number will increase by 5.8% (Keehan et al., 2011). The Centers for Medicare & Medicaid Services indicate that the nation’s health care spending will keep outpacing economic growth despite a recent slowdown and will reach approximately one-fifth of the gross domestic product by 2021. For this reason, there is a need to combat these rising costs on a national, regional, statewide, local, and individual level. Implementing health promotion strategies and interventions addresses that need by lowering health care costs and reducing the burden of rising health care costs on federal, state, and local governments. As such, the mission of national initiatives, including Healthy People 2020, is to improve the health status of Americans by (a) eliminating health disparities, preventable diseases, disabilities, and injuries, and (b) restructuring social and physical environments to promote healthy behaviors and lifestyles that will improve overall quality of life (United States Department of Health and Human Services [USDHHS], 2012). This mission is especially salient for the lives of persons with chronic illness and disability (CID).

The roles of rehabilitation health practitioners are to assist persons with CID to improve functioning, implement preventative strategies, increase quality of life, and enhance community participation (Lynch & Chiu, 2009). Many of these goals are achieved with health promotion. Health promotion is “a comprehensive social and political process” that enables individuals “to increase control over and improve their health” by “strengthening skills and capabilities” (Peterson, Hammond, & Cully, 2009; p. 147). Examples of health promotion programs include
health education and environmental change strategies and interventions. In fact, health promotion and disease prevention programs are rising steadily in the United States (Leviton, Snell, & McGinnis, 2000). People can participate in these programs regardless of their illness or disability status because wellness and CID are not mutually exclusive (Lynch & Chiu, 2009).

However, persons with CID face unique challenges to health promotion efforts. These challenges are especially evidenced by those living with HIV/AIDS, with some unique issues for African Americans (e.g., lower socioeconomic status, health disparities, and cultural factors) that further complicate health promotion efforts. Thus, health promotion models and interventions must be developed specifically for these groups so that they experience the benefits of disease management and health-promoting strategies.

**HIV and African Americans**

Prevalence rates of HIV infection in the United States continue to rise (El-Sadar, Mayer, & Hodder, 2010). Currently, more than one million persons are living with HIV in the United States, and 21%, or 1 in 5, are unaware of their infection (CDC, 2010a; El-Sadar, Mayer, & Hodder, 2010). The disease has a disproportionate effect on African Americans, who experience the “most severe burden of HIV” (CDC, 2010c; p. 1; Davidson, 2011). African Americans have a higher proportion of infection at all stages, from new infection to death. While representing only 12% of the U.S. population, African Americans account for 46% of persons living with HIV and 45% of new HIV infections (CDC, 2010c). In the time span from 2005 to 2008, the rate of HIV diagnoses for African Americans rose from 68 to 74 per 100,000 cases, the largest increase in rate by any race/ethnicity. A closer look at the disparity also shows gender distinctions. Statistics estimate that 1 in 16 African American men will contract HIV compared to 1 in 30 African American women.
Evidence shows that African Americans are more likely to postpone medical care and become hospitalized, leading to a greater incidence of disease progression and death for this group (Fullilove, 2006). According to the Centers for Disease Control and Prevention (CDC, 2010a), stigma places African Americans at a higher risk because fear of stigma-related discrimination may lead to persons postponing testing and subsequent treatment. Without treatment, disease progression may be more salient for this population. The disproportionate effect of HIV/AIDS on African Americans underscores the importance of implementing and sustaining effective culturally sensitive and ethnic-specific health promotion interventions for this population (Williams, 2003). This implementation is necessary due to the quick progression from HIV to AIDS for African Americans (leading to poor mortality and morbidity rates) and the lack of access to adequate health services from medical and allied health professionals (Williams, 2003). Research shows health promotion interventions that address health behavior change are effective for persons with HIV/AIDS (Williams, 2003). For example, engaging in physical activity/exercise and eating a healthy diet have been associated with increased immune functioning in persons with HIV/AIDS (Bopp et al., 2004; Highleyman, 2006). Even with the noted benefits to immune functioning, engaging in these health-promoting behaviors may be difficult for African Americans with HIV/AIDS due to difficulties in access to appropriate health care, access to health information, or other challenges to health promotion efforts.

In spite of these challenges, opportunities do exist for effective intervention geared toward encouraging African Americans to engage in health-promoting behaviors. Addressing these challenges begins with an examination of those factors present in existing models that do or do not work as effectively with diverse groups, then shifts the focus from those traditional models and interventions toward culturally sensitive models and interventions (Chan, Tarvydas,
The use of a culturally sensitive health promotion model will aid researchers, practitioners, and policy makers in identifying what variables better predict health-promoting behaviors for diverse groups, which can lead to interventions geared at modifying those variables for better health-related outcomes (Gandelman & Freedman, 2002). Thus, the development of a model of health promotion specifically for African Americans living with HIV/AIDS will lead to interventions that are more effective in improving health-related outcomes (e.g., health-related quality of life).

Several health promotion models already exist in the literature; however, the following section describes a theoretical framework that, with some adaptation, may be best suited for addressing the health promotion needs of African Americans living with HIV/AIDS, due to its integrative framework addressing the key variables of health behavior change.

**Theoretical Framework**

Of the current health promotion models, the Health Action Process Approach (HAPA) model appears to hold the most promise in predicting health-related outcomes and informing subsequent interventions. It possesses an integrative framework that addresses the variables associated with motivation, intention, and action toward engaging in health-promoting behaviors (Schwarzer et al., 2011). Previous research has identified the usefulness of this framework in predicting health-related outcomes for the general population, for cardiac rehabilitation populations (Schwarzer et al, 2011), and recently, for persons with multiple sclerosis (Chiu, Lynch, Chan, & Berven, 2011).

The HAPA model focuses on the (a) pre-intentional motivation that leads to a person’s intention to change behavior and (b) post-intentional volition that leads to health-promoting behavior (Schwarzer, 2008). Thus, implicit within the model are 2 phases: (1) the motivational
phase and (2) the volitional phase, with planning mediating intention and action between the 2 phases. What makes the HAPA model unique is this dual focus on pre-intentional and post-intentional factors related to engagement in health-promoting behaviors (Teng & Mak, 2011). Figure 1.1 presents the most recent schematic representation of the model.

Figure 1.1 Health Action Process Approach model of health promotion

Purpose of this Study

The HAPA model has been validated for the general population and for certain populations with CID. However, this study will be the first to address the usefulness of the HAPA model in predicting health-related outcomes for African Americans living with HIV/AIDS. This study will also address some “calls to action” in the fields of rehabilitation counseling and psychology. For example, Schwarzer and colleagues (2011) gave a recent call to
action for researchers to further test the usefulness of the HAPA model in predicting health-related outcomes for persons with CID. In addition, Chan et al. (2009) gave a call to action to improve outcomes for persons with CID via the use of model-driven, culturally sensitive, evidence-based practice.

Although the current HAPA model is a promising theoretical framework, African Americans living with HIV/AIDS have unique needs that it may not fully address. Based on a review of the literature on African Americans living with HIV/AIDS, adaptations have been made to the model presented in this study.

For example, this study will test an expansion and refinement of the HAPA model for African Americans living with HIV/AIDS that includes disease-specific (i.e., HIV severity) and culturally specific (i.e., spirituality) variables chosen from the research literature that, in conjunction with the variables of the original model, may further predict health-related outcomes. Figure 1.2 shows the schematic of the expanded model.

**Health-Related Outcomes**

Each of the variables in the expanded HAPA model, described in detail in Chapter 2, will be used to predict physical activity/exercise and health-related quality of life in African Americans living with HIV. Physical activity, defined as engaging in bodily movement to expend energy, has been associated with immunity protection in persons with HIV (Bopp et al., 2004). Health-related quality of life (HRQoL) is defined as a multidimensional outcome reflecting a person’s physical, mental, and social functioning in connection to health (Hays, Anderson, & Revicki, 1993). HRQoL is a relevant factor in a study of persons living with HIV because it offers additional information about the effects of disease severity and progression that
are not captured by laboratory methods (Cunningham, Crystal, Bozzette, & Hays, 1999) and that may impact treatment.

**Figure 1.2.** Expanded HAPA model of health promotion for African Americans living with HIV/AIDS

**Significance of the Study**

This study tests the usefulness of a health promotion model for African Americans living with HIV that predicts physical activity/exercise and HRQoL based on the theoretical framework of the HAPA model but is expanded and refined to address the unique needs of this population.
If the model is useful, it can be used as a framework for the development and implementation of new interventions that promote the health of African Americans living with HIV/AIDS.

**Research Questions**

1. Do the HAPA constructs (i.e., symptom severity, contextual factors, social-cognitive health variables, and theory of planned behavior variables) predict exercise behavior in people with HIV/AIDS?

   It is hypothesized that each set of predictor variables will significantly impact the effect size of the overall regression model.

2. Is the relationship between symptom severity and physical activity/exercise intention mediated by action self-efficacy, outcome expectancy, and risk perception?

   It is hypothesized that the relationship between symptom severity and physical activity/exercise intention will be mediated by action self-efficacy, outcome expectancy, and risk perception.

3. Is the relationship between physical activity/exercise intention and physical activity/exercise mediated by maintenance self-efficacy, recovery self-efficacy, and action and coping planning?

   It is hypothesized that the relationship between symptom severity and physical activity/exercise intention will be mediated by maintenance self-efficacy, recovery self-efficacy, and action and coping planning.

4. Is the relationship between symptom severity and health-related quality of life mediated by physical activity/exercise?

   It is hypothesized that the relationship between symptom severity and health-related quality of life will be mediated by physical activity/exercise.
CHAPTER TWO

Review of the Literature

As people are living longer, living healthy and well becomes more salient. Health promotion efforts assist with extending longevity and quality of life. Conceptually, health promotion is linked to the vision of the World Health Organization (Antonovsky, 1996). According to the World Health Organization (WHO), persons can live longer and healthier lives by eliminating risk factors associated with certain behaviors, mainly tobacco, alcohol, and substance use, unhealthy diet, and physical inactivity (WHO, 2008). Eliminating these risky behaviors and replacing them with health-promoting behaviors, such as eating a healthy diet and engaging in physical activity/exercise, can help to extend life, especially for people living with chronic illness and disability (CID).

Health Promotion Needs of People with Chronic Illness and Disability

Health promotion is necessary because engaging in healthy behaviors is an effective mechanism for preventing morbidity and mortality in the general population and among persons with CID (Schwarzer, Lippke, & Luszcynska, 2011). There has been a paradigm shift in health and rehabilitation efforts, from a disease model to a health model (Bandura, 2004). Persons with CID must focus more attention on the prevention of health-related problems or complications than does the general population (Lynch & Chiu, 2009; Ravesloot, Seekins, & Young, 1998). Research indicates that persons with CID are at a greater risk for obesity (Rimmer, 1999), mental health complications (Turner & McLean, 1989), and substance abuse issues (Janikowski, Cardoso & Lee, 2005). Furthermore, persons with CID are more susceptible to secondary conditions or complications (Ravesloot et al., 1998). If secondary conditions can be reduced or eliminated in persons with CID through the use of health promotion interventions and strategies,
overall health outcomes will improve, resulting in lower overall health care costs (Lynch & Chiu, 2009; Ravesloot, Seekins, & Young, 1998; Zemper et al., 2003).

Because health promotion is so necessary for persons with CID, it should be a major goal of the overall rehabilitation process (Chan, Chiu, Bezyak, & Keegan, 2012; Waldrop & Stern, 2003). As mentioned in the previous chapter, national efforts such as Healthy People 2020 (U.S. Department of Health and Human Services [USDHHS], 2010) have a strong emphasis on reducing disparities in health outcomes for persons with CID. For this reason, rehabilitation researchers are focusing more attention and efforts toward health promotion for people with CID (Ipsen, Seekins, & Ravesloot, 2010). All persons need to engage in healthier lifestyle habits (Bandura, 2004). However, one of the challenges in encouraging people toward health-promoting behaviors, specifically persons with CID, is increasing people’s motivation for change (Schwarzer et al., 2011). Health promotion theories provide a framework for intervention to counter that challenge, not only for the general population but also for persons with CID. Evidence shows that health-related complications such as physical deconditioning, fatigue, disrupted sleep patterns, weight-related issues, pain, and depressive symptoms can be improved by health promotion interventions based on empirically supported models (Ipsen et al., 2010).

**Health Promotion Needs of African Americans with CID**

The challenges experienced by persons with CID may be more salient for African Americans. Historically, health status among African Americans has been lower than their White counterparts dating as early as 1906, as can be seen in W.E.B. DuBois’s report entitled *The Health and Physique of the Negro American* (Nickens, 1990). In the early 20th century, most African Americans lived without access to a formalized system of health care, in poor housing, and with inadequate nutritional resources (Ashley, 1999). There was not a focus on the health
status of African Americans until a landmark document, a 1985 report from the U.S. Department of Health and Human Services’ Secretary’s Task Force on Black and Minority Health, contained a primary emphasis on health status for all minority groups and focused on health promotion and disease prevention (Nickens, 1990). Even so, the health status of African Americans continues to be problematic, with the majority of health problems being preventable (Ashley, 1999). Specifically, African Americans are behind in almost all indicators of health status (Ashley, 1999).

For example, the National Health Interview provides data on the health of U.S. citizens; and it reveals that African Americans are less likely to report excellent health. Only 28% of African American respondents identified their health status as excellent, compared to 38% of Whites and 36% of Asian Americans (Adams, Martinex, Vickerie, & Kirzinger, 2011). In fact, 13.9% of African Americans reported their health as fair or poor. In this survey, excellent health was associated with increased levels of education, higher family income, and private health insurance.

African Americans also experience other risk factors and health conditions that lead to increased mortality rates. Based on the current population estimates from the National Center for Health Statistics (2012), African Americans experience high rates of smoking (24.4% of men and 17.9% of women aged 18 and older), obesity (38.1% of men and 54.2% of women aged 20 and older), and hypertension (37.6% of men and 44.4 % of women aged 20 and older). The leading causes of death for African Americans are heart disease, cancer, and stroke (Heron, 2012), which are all associated with obesity, hypertension, and smoking.

Importantly, the National Health and Nutrition Examination Survey (NHANES, 2004) found a high prevalence of obesity (45%) among African Americans (Ogden, Carroll, Curtin,
McDowell, Tabak, & Flegal, 2006). Compared to the general population, a disproportionately high percentage of African Americans do not meet the minimum recommended level of physical activity/exercise established by the Centers for Disease Control and Prevention (CDC; Centers for Disease Control and Prevention [CDC], 2003). For example, the Behavioral Risk Factor Surveillance System (BRFSS) shows that 32% of African Americans do not engage in physical activity/exercise compared to 22% of Whites surveyed (Li, Serdula, Bland, Mokdad, Bowman, & Nelson, 2000). Statistics from NHANES (2004) show that compared to their White counterparts, African Americans are 38% less likely to meet the recommendations for fruit and vegetable consumption (Casagrande, Wang, Anderson, & Gray, 2007). These racial disparities have also been reported for consumption of foods with saturated fat (Casagrande et al., 2007).

Casagrande et al. (2009) conducted a systematic review of the literature that examined health behaviors and environmental impacts for African Americans. They found several environmental factors that were associated with physical activity/exercise and healthy diet in African Americans. Light traffic, sidewalks in neighborhoods, and safety from crime were all positively associated with physical activity/exercise. Also, their review showed that perceived barriers to physical activity/exercise were associated with obesity. Even though these barriers and disparities exist, opportunities for health promotion for African Americans remain.

Ashley (1999) gives several recommendations for health promotion for African Americans in this country. First, more research is needed on health-related values, beliefs, practices, and barriers experienced by African Americans. Second, aspects of African American culture (e.g., spirituality) need to be incorporated into the design of effective interventions targeted and tailored to this population. Third, there is a need for community partnership in all aspects of health promotion including planning, implementation, and evaluation. Ashley
summarizes by stating that health promotion efforts for African Americans should be “comprehensive, multifaceted, and culturally relevant to the community” (p. 239).

**Health Promotion Interventions for Persons with CID**

Empirical evidence shows that engaging in physical activity/exercise and eating a healthy diet improve the health status of persons with CID. For instance, Ravelsoot and colleagues (Ravesloot, Seekins, & White, 2005; Ravesloot et al., 1998; Ravesloot et al., 2003) implemented Living Well With a Disability as a health promotion behavioral intervention to increase health-promoting behaviors in persons with physical disabilities in the areas of maintaining good mental health, seeking health information, and eating a healthy diet. They found that persons who participated in the program were less impacted by secondary conditions than were those who did not participate in the program. This study has several implications because participants reported fewer symptomatic days, lowered health care costs, an increase in life satisfaction, and a commitment to engaging in health-promoting behaviors (Ravesloot et al., 2005).

For persons with spinal cord injury, Zemper et al. (2003) evaluated the efficacy of a holistic wellness program that included interventions aimed at improving physical activity/exercise, nutrition, and lifestyle management and reducing secondary conditions. In comparison with the control group, those persons who participated in the intervention program reported less severe secondary health conditions and an increase not only in health-promoting behaviors but also in self-efficacy related to engaging in those behaviors.

An important consideration in discussions of health promotion programs for persons with CID is access. The research literature is saturated with studies evaluating the efficacy of health promotion interventions in the workplace. However, to reap the benefits of such interventions,
persons need to be gainfully employed, and typically these programs do not align with the needs of persons with CID (Holland et al., 2003). Because unemployment is highly correlated with persons with disabilities, these persons are less likely to participate in employer-sponsored wellness programs (McNeil, 2001). A review of the literature by Harrison (2006) shows that few health promotion interventions are targeted toward persons with disabilities despite findings that persons with disabilities report better outcomes when engaging in health-promoting behaviors. Because health promotion programs are scarce for persons with CID and because research identifies access to these programs as a major barrier, Ipsen (2006) has put out a call to action for the gap between research and practice to be narrowed in terms of health promotion for persons with CID. “Narrowing this gap” refers to translational research, and the goal of many sponsoring agencies, such as the National Institutes of Health, is to move basic research into the clinical settings so that communities (apart from the scientific community) benefit from this knowledge (Kerner, Rimer, & Emmons, 2005), including the community of persons with CID.

Health Promotion Outcomes

Several outcome measures can be used to assess the effects of engaging in health promotion. The following sections describe two such outcome measures: physical activity/exercise and health-related quality of life.

Physical activity/exercise

Physical activity has been described as “bodily movement produced through muscular activity that results in energy expenditure” (Bopp, Phillips, Fulk, Dudgeon, Sowell, & Hand, 2004; p. 387). Exercise is a structured form of physical activity for the purpose of improving physical fitness (Bopp et al., 2004). Recommendations from the U.S. Surgeon Generals’ Report (USDHHS, 2005) indicated that adults should engage in at least 30 minutes of moderate-
intensity physical activity/exercise most days of the week. As early as 1989, researchers stated that an increase in daily physical activity/exercise was associated in a decrease in all-cause mortality (Blair et al., 1989). Engaging in physical activity/exercise is an essential component of health promotion and disease prevention efforts because research shows that it has the potential to increase functional independence and decrease the risk or impact of chronic illness (Washburn, Zhu, McAuleey, Frogley, Figoni, 2002). Unfortunately, statistics show that persons with CID are less likely to engage in physical activity/exercise compared to the general population (USDHHS, 2010).

Engaging in daily physical activity/exercise decreases one’s risk for chronic illnesses (e.g., hypertension) and improves a person’s overall quality of life (Pate et al., 1995). Furthermore, engaging in regular physical activity/exercise (a) decreases risk of death due to heart disease, hypertension, certain forms of cancer, and diabetes; (b) improves stamina and muscle strength for persons with CID; and (c) reduces symptoms of mental health disorders such as depression and anxiety (USDHHS, 2005). Evidence shows that physical activity/exercise helps individuals cope with chronic health conditions because it gives individuals a sense of control and empowerment that may help to enhance life expectancy (Pender, Murdaugh, & Parsons, 2006).

**Health-related quality of life**

Historically, the idea of quality of life (QoL) developed as a solution to the series of major socio-political debates about social progress and crisis occurring in the 1960s and 1970s (Armstrong & Caldwell, 2004). Arguments centered on ethical considerations related to the advancement in medical technology and the goal of health care with aging populations and persons with CID. More specifically, the construct of health-related quality of life (HRQoL)
emerged to provide a solution to the problem of confounding the concepts of health and disease with QoL (Anderson & Burckhardt, 1999). Hays, Anderson, and Revicki (1993) defined HRQoL as “how well an individual functions in daily life and his or her perceived well-being” (p. 441). This definition is multidimensional and includes a person’s physical, mental, and social functioning. HRQoL includes the effects of health, illness, and treatment on QoL while excluding other aspects not attributed to health, such as cultural, political, or societal factors (Ferrans, Zerwic, Wilbur, & Larson, 2005). As a cautionary note, it may be difficult to distinguish between factors related and non-related to HRQoL; for persons with CID, most areas of life can be considered health-related. Characteristically, HRQoL is used in the medical and allied health fields (Bishop, Chapin & Miller, 2008). By measuring HRQoL, clinicians are better able to identify the significance of disease prevention, injury, and disability apart from traditional laboratory markers (CDC, 2000).

**Health Promotion and HIV/AIDS**

The previous section explained the importance of implementing health promotion programs and evaluating outcomes such as physical activity/exercise and HRQoL in persons with CID. Monitoring such health promotion needs is especially necessary for persons living with HIV/AIDS, specifically African Americans, a group that is disproportionately impacted by the virus.

The human immunodeficiency virus (HIV) destroys the cells that fight disease and has the potential to lead to acquired immune deficiency syndrome (AIDS), the final stage in which the body has no mechanism for fighting off disease or infection. At this time, there is still no cure for HIV (CDC, 2010a). Medication and support services can slow down the progression of the virus and allow persons to lead healthy, fulfilling lives (Dieffenbach & Fauci, 2011). Several
advances have been made in HIV-related research and treatment, such as implementation of testing and counseling services, the introduction of antiretroviral therapy (ART) and highly active antiretroviral therapy (HAART), prevention of mother-child transmission, mechanisms for screening blood products, and specific educational/behavioral interventions targeted to at-risk populations (Dieffenbach & Fauci, 2011). Over the past 30 years of HIV/AIDS, researchers now understand the virus and its pathogenesis; practitioners can rapidly diagnose HIV infection, and virus replication can be suppressed with HAART (Gallo & Montagnier, 2003). In contrast to the start of the pandemic in the early 1980s, a 20-year-old today who is diagnosed with HIV and begins recommended therapy (e.g., prescription of HAART) is expected to live at least an additional 50 years, which is close to normal life expectancy (Antiretroviral Therapy Cohort Collaboration, 2008).

Medical Aspects of HIV/AIDS

The following sections describe the key topics for understanding the medical aspects of HIV/AIDS: CD4 count and viral load, medication adherence, and symptoms.

**CD4 count and viral load.** The biomarkers of CD4 count and viral load are the most widely used indicators of HIV disease (Gill, Griffith, Jacobson, Skinner, Gorbach, & Wilson, 2002). These indicators provide useful prognostic data used to judge one’s response to ART or HAART (O’Brien et al., 1997) and risk of opportunistic infections; they are also used to predict HRQoL (Testa & Simonson, 1996). CD4 count refers to the number of CD4 T-cells in the body that support immune function. Viral load refers to the number of actual copies of HIV in the person’s bloodstream. Typically, the higher a person’s HIV viral load, the lower his or her CD4 cell count, which has the potential to lead to opportunistic infections. Opportunistic infections
occur because of the vulnerability of one’s immune system, which would typically be able to fight such infections (e.g., bacterial, fungal, or viral).

Evidence showing a link between CD4 count/viral load and HRQoL is limited (Gill et al., 2002). The advent of HAART, which significantly impacts these biomarkers (lowers viral load and raises CD4 count), has created some adverse effects (e.g., medication side effects) that may impact one’s HRQoL (Gill et al., 2002). Some research does show that improving a person’s CD4 count has a positive impact on HRQoL (Gill et al., 2002). As a caveat, this positive impact only occurs if one’s viral load is lowered to an undetectable level (minimal traces of HIV in one’s system).

**Mediation adherence.** Prior to ART and HAART, persons quickly progressed from HIV infection to AIDS; and the median survival time after a diagnosis of AIDS was weeks or months (Hymes, Cheung, Greene, Prose, Marcus, Ballard, et al., 1981; Rothenberg, Woelfel, Stoneburner, Milberg, Parker, & Truman, 1987). At that time, persons with HIV/AIDS died because of a multitude of opportunistic infections and AIDS-related cancers (Hymes et al., 1981; Rothenberg et al., 1987). Now, there are several antiretroviral drugs for the treatment of HIV infection including protease inhibitors (PIs), nucleoside reverse transcriptase inhibitors (NRTIs), and non-nucleoside reverse transcriptase inhibitors (NNRTIs) (Carballo et al., 2004; Dieffenbach & Fauci, 2011). These drugs are able to suppress replication of the viral cells below detectable limits, also known as an undetectable viral load. Due to the advancements in medication regimens for persons with HIV, there are now fewer hospitalizations (Keitz, Box, Homan, Bartlett, & Oddone, 2001). However, only about one-third of persons infected with HIV who need ART/HAART actually receive it (WHO, 2010). This number may be due to barriers in access to medication, both physical (e.g., clinic access) and psychosocial (e.g., stigma).
Symptoms. Symptoms reflect a person’s experience of HIV disease (Justice et al., 2001) and are associated with HRQoL (Lorenz et al., 2001). This perception can be physical, emotional, or cognitive (Wilson & Cleary, 1995). Persons with HIV/AIDS who have more symptoms report decreased HRQoL and vice versa. Furthermore, the medications that treat HIV have their own associated symptoms, which make medication adherence difficult for persons with HIV (Justice et al., 2001). This, in turn, has a subsequent impact on CD4 cell count and viral load, which impacts HRQoL.

These symptoms, related to the disease or medication to treat the disease, have the potential to impact one or more body systems (e.g., gastrointestinal). In a study by Buseh, Kelber, Steven, and Park (2008), the most prevalent symptoms reported by a sample of 55 African American men living with HIV/AIDS were fatigue (98.2%), fear (92.7%), shortness of breath (92.7%), gastrointestinal upset (85.5%), numbness (80%), and headache (76.4%). These men were asked to report other symptoms, and several common symptoms emerged, including anxiety (76.4%), insomnia (75%), weight loss (61.8%), blurred vision (60%), and itchy skin (58%). The inclusion of symptom intensity to the hierarchical regression model accounted for an additional 5% of variance in overall QoL. The results of this study show support for incorporating symptom assessment and treatment in addressing QoL in African American men living with HIV/AIDS. As such, incorporating symptoms as predictors will provide substantial information related to HRQoL.

Psychosocial Aspects of HIV

Many psychosocial aspects of HIV/AIDS exist. Two important ones are stigma and depression.
Stigma. Stigma related to a health condition is perceived, real, or imagined fear or concern of negative attitudes associated with the condition, or enacted, actual experiences of discrimination associated with the condition (Brown, Macintyre, & Trujillo, 2003). Evidence shows an association of stigma with a variety of health conditions, including visible conditions (e.g., amputation) and concealable conditions (e.g., HIV; Berger et al., 2001). Persons with stigmatized health conditions can experience depression, anxiety, minimal social support, and low self-esteem (Berger et al., 2001).

HIV-related stigma. Berger, Ferrans, and Lashley (2001) developed a conceptual model of perceived stigma for persons with HIV to guide the development of a scale to assess the construct. They theorized that perceived stigma occurs via two factors: (a) a person’s perception of the attitudes of others toward persons with HIV, and (b) a person’s own knowledge about living with the infection. Thus, perceived stigma is “conceptualized as persons with HIV’s awareness of HIV related actual or potential social disqualification (e.g., less than full social acceptance, social rejection), denial or limitation of opportunity (e.g., housing, jobs, or dental services), and negative change in social identity (e.g., how others see them)” (p 520). Stigma related to HIV has been associated with a loss in self-esteem and diminishing social interactions with others (Fife & Wright, 2000; Murphy, Austin, & Greenwell, 2006). Empirical evidence shows other correlates to HIV-related stigma as depression, anxiety, loneliness, suicidal ideation, and lowered treatment adherence (Courtenay-Quirk, Wolitski, Parson, & Gomex, 2006; Murphy, Austin, Green, 2007; Relf, Mallinson, Pawlowski, Dolan, & Dekker, 2005; Vanable, Carey, Blair, & Littlewood, 2006). Persons who perceive greater HIV-related stigma also report more alcohol use, possibly as a form of coping (Murphy et al., 2007), although more research is needed in this area. It is important to address perceived stigma in persons with HIV because it
has been associated with not accessing necessary health care service services (k et al., 2007),
depression (Kalichman, Ramachandran, & Catz, 1999), and seeking out social support (Berger et
al., 2001), which all have the potential to impact health-related outcomes (e.g., HRQoL).

**HIV-related stigma and African Americans.** For African Americans, stigma associated
with HIV has a negative impact on overall outcomes (Galvan, Davis, Banks, & Bing, 2008).
Evidence shows that African Americans are more likely than European and Latino Americans to
endorse statements reflecting discrimination against persons living with HIV (Kaiser Family
Foundation, 2004). There is a need for HIV-stigma-informed interventions for African
Americans living with HIV/AIDS (Radcliffe et al., 2010). For African American men
particularly, addressing HIV stigma may lead to better HRQoL (Buesh et al., 2008).
Interventions that address HIV stigma should be targeted toward protecting against internalized
feelings of shame (Radcliffe et al., 2010). Radcliffe et al. (2010) examined HIV stigma and
sexual health risk among young African American men living with HIV/AIDS who identified
themselves as men who have sex with men (MSM). The study revealed that 88% of partici-
pants experienced HIV stigma. Many participants reported feelings of shame regarding HIV status.
Results showed that participants who were taking ART endorsed more items reflecting higher
levels of HIV stigma than did participants who had not taken ART, and that persons with high
HIV stigma were significantly more likely to have unprotected sex while using drugs and/or
alcohol.

Buesh et al. (2008) showed that perceived health was inversely correlated to HIV stigma
in African American men, that is, the higher these men perceived themselves as healthy, the
lower their reported experience of HIV stigma. Furthermore, more severe symptoms and lower
levels of QoL were associated with higher reports of HIV stigma. Lastly, higher educational
attainment was associated with lower HIV social stigma, better self-rated health, and higher QoL. Adding HIV stigma to a hierarchal linear regression explained 40.8% of the variance in QoL in Buesh et al.’s study. More study results about HIV-related stigma provides valuable information about health status, seeking of treatment, and QoL.

**Depression.** In her review of the literature on HIV and depression, Rabkin (2008) states that “in the context of HIV/AIDS, depression is an often overlooked but potentially dangerous condition that can influence not only quality of life, relationships, employment, and adherence to medical care, but also perhaps survival” (p. 163). Evidence points to high levels of psychological distress among African Americans living with HIV/AIDS (Lyon & Munro, 2001; Shacham, Basta, & Reece, 2008). They are found to have higher levels of untreated depression (Lyon & Munro, 2001). In general, persons living with HIV/AIDS who do not adhere to their medication regimen report greater levels of psychological distress, emotional disturbance, depression, and poor adaptive coping compared to persons living with HIV/AIDS who do adhere to their medication regimen (Singh et al., 1996). Depression is associated with factors such as isolation, loss of pleasure, impairment in social and vocational activities, poor diet, not engaging in physical activity/exercise, and not adhering to medical recommendations (Rabkin, 2008).

Measuring depression in persons with HIV/AIDS is difficult because somatic symptoms associated with the virus (e.g., fatigue, weight loss/gain) mimic the symptoms of depression, and vice versa (Rabkin, 2008). Another important issue concerning depression in persons with HIV/AIDS is whether or not depression predicts clinical progression of HIV/AIDS (Rabkin, 2008). One study showed that men with symptoms of depression who scored high on a depression measure had a higher risk of progression to AIDS (Page-Schafer, Delorenze, Satariano, & Winkelstein, 1996). Another study showed that depression predicted a decline in
CD4 cells and death for a sample of 305 persons with HIV, even after controlling for non-adherence behaviors (Bouhnik et al., 2005). Thus, it is important to address depression in persons with HIV/AIDS because it is predictive of health status and mortality.

**Health Status of African Americans Living with HIV**

The health status of African Americans living with HIV is associated with societal barriers to health care. In regard to HIV/AIDS, Davidson (2011) states that “African Americans continue to be disproportionately burdened by this debilitating disease because many barriers continue to exist regarding the successful implementation of prevention programs and risk-reduction efforts” (p. 84). Examples of these barriers include lack of adequate health care and medical insurance due to lower socioeconomic status, which may shift one’s focus to basic survival needs (e.g., food and shelter and illness management) rather than health-promoting behaviors (Davidson, 2011).

Fundamental social cause theory posits that “as we learn more about how to prevent or treat diseases, the benefits of this new knowledge are not distributed equally through the population, but are harnessed more securely by those who are less likely to be exposed to discrimination and who have greater access to knowledge, money, power, prestige, and beneficial social connections” (Rubin, Colen & Links, 2009, p. 1053). As an example, socioeconomic status and race/ethnicity have been found to be factors associated with receiving ART medication interventions used to treat HIV. Furthermore, even though HIV mortality rates decreased with medical intervention of HAART, this decline was not uniformly distributed among population groups. Rubin and colleagues (2009) found that the factors of White race and higher socioeconomic status were associated with advantages in HIV treatment and mortality. In a study addressing racial disparities in HAART, Gebo and colleagues (2004) showed that
African Americans are less likely to receive HAART due to a lack of health insurance. Furthermore, African Americans with advanced HIV who are engaged in outpatient treatment are less likely to be prescribed HAART by providers, even when controlling for the frequency of outpatient visits (Gebo et al., 2004). Gebo and colleagues suggest that these disparities increase the risk of morbidity and mortality among disadvantaged populations including African Americans.

Predictors of health status. This section provides a glimpse of some of the reported predictors of health status for African Americans living with HIV/AIDS. A study by Stoskopf, Richter, and Kim (2001) shows significant differences in the health status of African Americans living with HIV/AIDS by gender, education, employment, and health insurance status. Specifically, researchers report that African Americans with HIV/AIDS who have private health insurance are five times more likely than those without health insurance to report their health status as good or excellent. There are also certain gender distinctions. For African American women, self-reported physical health was predicted by family stressors, and the association between family stressors and self-reported health was mediated by depressive symptoms (Jones, Beach, Forehand, & Foster, 2003). As for perceived health in African American men, 67.9% of a sample of 55 African American men living with HIV/AIDS reported their health as good to excellent, even when experiencing several symptoms (Buseh, Kelber, Stevens, & Park, 2008). However, this study showed a significant difference based on disease progression because those men who were HIV-positive and asymptomatic perceived their health as better than those who had progressed to AIDS. In this study, 70.8% of the variance in overall quality of life was predicted by sociodemographic characteristics (13.2%; age, educational attainment, disease
progression, years since HIV diagnosis, sexual orientation), perceived health (11.1%), HIV stigma (40.8%), and intensity of symptoms (5.6%).

In a recent study, Heeren and Jemmott (2011) conducted focus groups with African American men. Participants were asked about their interest in participating in a health promotion program as well as their current health status, strategies for self-regulation, health knowledge, health beliefs, and HIV testing and prevention. Results of the study reveal that the participants (a) lacked knowledge on disease preventive strategies, (b) perceived themselves as low risk for health conditions such as hypertension and diabetes, (c) perceived themselves as low risk for sexually transmitted diseases such as HIV, even when admitting minimal condom use and with 17% of participants self-identified as HIV-positive, and (d) lacked knowledge about HIV/AIDS and other sexually transmitted diseases. However, participants did express an interest in participating in health promotion programs and suggested that these programs should be tailored to include: (a) cancer screenings; (b) psychoeducational interventions about the prevention of communicable diseases (e.g., HIV), hypertension, and diabetes; and (c) interventions focused on smoking and drug cessation.

**Health Promotion Outcomes of Persons Living With HIV/AIDS**

A section earlier in this chapter describes the importance of evaluating health promotion outcomes such as physical activity/exercise and HRQoL in persons with CID. Monitoring these outcomes is especially necessary for African Americans living with HIV/AIDS.

**Physical activity/exercise.** Physical activity/exercise interventions have been shown to be beneficial for persons living with HIV/AIDS (Bopp et al., 2004), but there is mixed evidence. In the 1990s, LaPerriere et al. (1991, 1994) showed that aerobic conditioning increased CD4 counts. Evidence also supports a link between lower CD4 counts and non-compliance with
physical activity/exercise recommendations (MacArthur et al., 1993). An epidemiological study shows that self-reported physical activity/exercise participation was associated with CD4 counts that were 107.5% higher than the counts of those who did not report engaging in physical activity/exercise (Mustafa et al., 1999). However, Rigsby et al. (1992), Roubenoff et al. (1999), and Smith et al. (2001) found that aerobic conditioning had no impact on viral load or CD4 counts. This mixed evidence may be due to the populations examined (Bopp et al., 2004). For persons with HIV seronegative status, physical activity/exercise may have little or no impact on CD4 counts. If physical activity/exercise is used as a form of stress management by persons with lower socioeconomic status and greater life stressors, these persons may experience an increase in their CD4 counts because of a replenishing of CD4 cells that were lost through stress-induced illness (LaPerriere et al., 1991, 1994).

Bopp et al. (2004) conducted a study with 66 symptomatic persons with HIV, in which the majority were African American (N = 61). Participants were given a wrist actigraph to wear on their dominant hand for 3 days to measure normal daily physical activity/exercise. In this study, physical activity/exercise was inversely related to viral load ($r = -.43, p < .01$). There was no relationship between physical activity/exercise and CD4 count. Bopp et al. (2004) posit that this finding may have been because the level of physical activity/exercise failed to reach a certain intensity or threshold for a training effect. These researchers suggest that a formal exercise program that includes aerobic and resistance training may be beneficial to persons living with HIV/AIDS. Their study provides evidence that increasing daily physical activity/exercise leads to health benefits for person living with HIV/AIDS.

**HRQoL.** Currently, guidelines for HIV treatment and outcome measurement recommend that practitioners consider HRQoL (DHHS, 2003). HRQoL is an important outcome
measurement for persons living with HIV/AIDS due to the “disease’s chronic debilitating course and the uncertain effects of current treatments on morbidity: new antiretroviral treatments improve survival, but the durability of the therapeutic effect is uncertain and severe side effects are common” (Hays et al., 2000, p. 17). Research in the late 1990s and early 2000s failed to link physiological and HRQoL variables for persons living with HIV (Sousa et al., 1999; Weinfurt, Willke, Glick, Freimuth, & Schulman, 2000). For example, research in this timeframe showed only a weak relationship between biomarkers (e.g., CD4 count and viral load) and HRQoL for persons living with HIV/AIDS (Miners et al., 2001). However, during this same time, symptoms emerged as a significant predictor of HRQoL for persons living with HIV (Franchi & Wenzel, 1998; Sousa et al., 1999). Research has demonstrated that the number and frequency of HIV symptoms mediates the relationship between CD4 count and HRQoL (Smith, Avis, Mayer, & Swislow, 1997). More recently, evidence shows that for persons with HIV higher HRQoL is associated with higher CD4 counts and lower viral loads (Burgoyne, Rourke, Behrens, & Salit, 2004; Vidrine, Amick, Gritz, & Arduino, 2003), with fewer self-reported symptoms (Preau et al., 2005), and with whether a person has private health insurance (Campsmith, Nakashima, & Davidson, 2003). Because of these links shown in recent research, it is important that this study address HRQoL as an outcome.

**Health Promotion Models**

The use of empirically supported health promotion models has the potential to better inform interventions aimed at health behavior change for persons with CID. The following sections provide an overview of the empirically supported models found in research literature, including both continuum and stage models of health promotion.
Continuum Models of Health Promotion

The continuum model of health promotion positions an individual on a continuum that identifies the likelihood that the individual will engage in a certain action (Schwarzer et al., 2011 p. 162). To create this continuum, Schwarzer and colleagues input hypothesized variables (e.g., risk perception) into an equation that predicts the likelihood of engagement in action. With continuum models, the goal is to move a person along this range or continuum toward action. Thus, the focus of intervention is to increase the hypothesized predictor variables (e.g., self-efficacy) in persons to move them toward action (e.g., physical activity/exercise). Examples of these continuum models include the health belief model (HBM; Becker et al., 1977), social cognitive theory (SCT; Bandura, 1986), the theory of reasoned action/theory of planned behavior (TRA/TPB; Ajzen, 1991), and protection motivation theory (PMT; Rogers, 1975).

Health Belief Model. The first health belief model was conceptualized by Becker et al. (1977) based on the combined work of (a) Hochbaum (1958), who found that perceived susceptibility to tuberculosis and the belief that people can have the disease and be symptom-free was the determining factor in chest X-ray screenings; (b) Kegeles (1963), who found that perceived susceptibility to dental problems and awareness that regular dental check-ups were helpful in preventing these problems predicted frequency of dental visits, and (c) Haefner and Kirscht (1970), who found that increasing a person’s perceived susceptibility, perceived severity, and anticipated benefits via health education predicted that person’s number of doctor’s visits for regular checkups (Rosenstock, 1974; Abraham & Sheeran, 2005). Based on this research, Becker et al. (1977) conceptualized the health belief model (HBM). The HBM postulates that preventive health action is a function of susceptibility, severity, benefits, and costs (Sanderson, 2004), which relate to threat perception and behavioral evaluation (Abraham & Sheeran, 2005).
Perceived susceptibility occurs at the individual level and relates to a person’s belief that he or she is vulnerable to a health-related problem (Abraham & Sheeran, 2005; Lynch & Chiu, 2009). Perceived severity also occurs at the individual level and relates to a person’s belief in the anticipated consequences of a health-related problem. Perceived benefits relates to the beliefs that engaging in a particular health-related behavior will be worthwhile and helpful. Perceived costs relates to the belief that there will be barriers to engaging in a particular health-related behavior. The final proposition of the model is that there are cues to action that trigger or act as a reminder for the person to engage in the health-related behavior.

Social Cognitive Theory. Albert Bandura conceptualized Social Cognitive Theory (SCT) in 1986. This theory was influenced by Miller and Dollard’s (1941) social learning theory. As a precursor to SCT, social learning theory states that (a) learning occurs by watching others, (b) learning is an internal process that does not always reveal itself in behavior, (c) goal directedness is central to behavior, (d) persons learn to exert control over their behavior, and (e) reinforcement and punishment have both direct and indirect effects on behavior (Ormrod, 2004). This learning by watching others refers to modeling, which can be direct or indirect (Sanderson, 2004). Direct modeling refers to people observing others in their social network (e.g., family or friends) engaging in a particular behavior. Indirect modeling refers to people observing others in the social world, such as people in the media, engaging in a particular behavior. This concept of modeling is important because social modeling impacts motivation for behavior change by instilling outcome expectations for behavior (Luszczynska & Schwarzer, 2005). Social modeling does not just involve a person mimicking behavior that is observed, but through social modeling, the person is able to create new behavior patterns that go beyond what is observed via direct or indirect modeling (Luszczynska & Schwarzer, 2005).
Building on social learning theory, SCT states that a person’s behavior is based on and sustained by personal and environmental factors, including physical and social factors (Bandura, 1986). Within SCT, Bandura (1997) postulated a model of triadic reciprocal causation, which states that “people are actors as well as products of their environment” (Luszczynska & Schwarzer, 2005, p. 128). This triadic reciprocal causation model includes personal determinants, behavioral determinants, and environmental determinants (Bandura, 1997).

A decade after conceptualizing SCT, Bandura (1997) advocated that his theory plays a pivotal role in health behavior change. According to SCT, behavior change occurs because of people’s sense of control over their actions (Luszczynska & Schwarzer, 2005). If people believe that they can take the necessary action steps for the desired behavior, they will be more likely to engage in that behavior (Luszczynksa & Schwarzer, 2005). It is this principle that relates to two of the key concepts of SCT: perceived self-efficacy and outcome expectancy. The combination of self-efficacy and social learning theory, described earlier, makes up SCT (Bandura, 1986).

**Perceived self-efficacy.** Self-efficacy refers to people’s ability to perform an action toward a desired outcome (Bandura 1986, 1997). If individuals believe in their ability to achieve desired goals, they are more likely to commit to decisions related to those goals. In this sense, self-efficacy involves a person’s affect, behavior, and cognition. It is important to note that self-efficacy does not involve unrealistic optimism about one’s capabilities to engage in a particular behavior; instead, it refers to people’s belief in their ability to engage in behavior within their ability or skill level (Luszczynska & Schwarzer, 2005). A strong sense of self-efficacy is related to persistency, optimism, better social integration, a strong sense of competency, better decision making, and increased goal setting (Bandura, 1997, 2001; Bandura et al. 2002; Maddux, 1995).
Without self-efficacy, individuals are unable to achieve desired outcomes (Chou, Ditchman, Pruett, Chan, & Hunter, 2009).

**Outcome expectancy.** Outcome expectancy refers to a person’s belief about the consequences of engaging in a particular behavior (Bandura, 1997; Luszczynksa & Schwarzer, 2005). There are three areas of outcome expectancies: physical, social, and self-evaluative. Each of these areas includes (a) positive and negative consequences, and (b) short-term and long-term consequences. Physical outcome expectancy involves anticipation of what will occur after behavior change. For example, the behavior change of smoking cessation may include short-term physical outcome expectancies such as reduction in coughing (positive consequence) and greater anxiety (negative consequence), and may include long-term physical outcome expectancies such as lower susceptibility to respiratory infection (positive consequence) and increased weight gain (negative consequence). Social outcome expectancy involves anticipation of social responses post-behavior change, such as losing friends or receiving support and encouragement from family. Self-evaluative outcome expectancy involves anticipation of consequences related to internal standards of evaluation, such as feeling ashamed or proud.

It is the combination of perceived self-efficacy and outcome expectancy that influences goal setting and subsequently behavior change (Luszczynksa & Schwarzer, 2005).

**Five determinants of behavior change.** SCT postulates five determinants of behavior change: (1) knowledge, (2) self-efficacy, (3) outcome expectancy, (4) goals, and (5) facilitators and impediments (Bandura, 2004). Knowledge refers to information about the risks and benefits associated with behavior change. Self-efficacy, once again, refers to people’s confidence in themselves to execute the desired behavior change even in the face of obstacles. Outcome expectancy, as mentioned previously, refers to the pros and cons of the desired behavior change.
including physical, social, and self-evaluative outcomes. Facilitators and impediments refers to those factors, both internal and external, that assist or prevent a person from engaging in the desired behavior change. These determinants of behavior change have specific implications for health behavior change.

**Empirical evidence.** The construct of self-efficacy from SCT has been included in several health promotion models, as the following sections will show. The theory, as a whole, has been applied to several health behavior studies including adhering to medical recommendations (William & Bond, 2002), engaging in safer sexual behaviors (Wang et al., 2003), engaging in physical activity/exercise (Rovniak et al., 2002), and eating a healthy diet and managing one’s weight (Schnoll & Zimmerman, 2001). As an example of engaging in physical activity/exercise, Motl et al. (2002) found that applications of SCT assisted adolescents in participating in vigorous physical activity/exercise, with self-efficacy being the strongest predictor of moderate and vigorous physical activity/exercise.

**Theory of Reasoned Action/Theory of Planned Behavior.** The theory of reasoned action (TRA) was developed by Fishbein and Ajzen (1975) and reconceptualized as the theory of planned behavior (TPB; Ajzen, 1991). In TPB, behavior is predicted by both intention and perceived behavioral control. A person’s intent to engage in a particular behavior (e.g., physical activity/exercise) is determined by attitude, subjective norms, and perceived behavioral control (Conner & Sparks, 2005). Attitude refers to a person’s overall evaluation of the behavior (e.g., benefits of engaging in physical activity/exercise). Subjective norms refer to a person’s belief about whether or not significant others (e.g., family members) support engaging in the desired behavior. Perceived behavioral control refers to a person’s perception of whether engaging in the desired behavior is easy or difficult. According to TPB, perceived behavioral control (a)
mediates the relationship between intention and behavior, and (b) directly predicts behavior (Ajzen, 1991). Criticisms of this model reveal that the gap between intention and action is too large (Conner, Sandberg, & Norman, 2010) and that the concept of perceived behavior control is too similar to self-efficacy, described previously.

**Empirical evidence.** Evidence supports the predictive ability of TPB for engaging in health-promoting behaviors. In breast cancer survivors, constructs of TPB explained 45% of the variance in exercise intention (Blanchard, Courneya, Rodgers, & Murnaghan, 2002). Results also showed that exercise intention explained 30% of the variance in exercise behavior. Downs and Hausenblas (2005) conducted a meta-analysis of 111 studies evaluating TPB. Results of this meta-analysis show moderate effect sizes in the relationships between (a) perceived behavior control and behavior, and (b) intention and subjective norm. Additionally, large effect sizes were found in the relationships between intention and (a) behavior, (b) perceived behavioral control, and (c) subjective norm.

**Protection Motivation Theory.** Protection motivation theory (PMT) was developed by Rogers (1975) in order to provide an explanation for the impact of fear appeals on behavior (e.g., physical activity/exercise). The term protection motivation refers to the intention to perform a desired behavior. In 1983, Rogers extended the theory into a more general model of the impact of persuasive communicating, emphasizing the cognitive processes that mediate behavior change (Norman, Boer, & Seydel, 2005). The theory postulates that environmental information (e.g., barriers and resources) and interpersonal information (e.g. self-efficacy) initiates two separate appraisal processes: threat appraisal and coping appraisal. Threat appraisal refers to factors that increase or decrease a maladaptive response (e.g., denial). Maladaptive responses are inhibited by a person’s perception of the severity of and vulnerability to a potential threat (e.g., physical
deconditioning). Fear is the linking or intervening variable between severity and vulnerability for threat appraisal. Coping appraisal refers to coping responses available within the person to counter the perceived threat. These responses can be adaptive or maladaptive. A person’s response efficacy, or belief that engaging in the desired behavior will reduce the threat, and self-efficacy, or belief that he or she is able to perform the desired behavior, increase the probability of an adaptive coping response.

*Empirical evidence.* Most studies on PMT use it as a model for persuasive communication (e.g., Floyd et al., 2000). Few studies look at PMT as a predictive model for engaging in health-promoting behaviors (Norman, Boer, & Seydel, 2005). In two studies, Plotnikoff and Higginbottom (1995, 2002) reported self-efficacy as the strongest predictor of exercise intention, but severity and vulnerability emerged only as weak predictors of intention. These researchers also found evidence supporting the predictive ability of intention on exercise behavior.

*Advantages and Disadvantages of Continuum Models.* Schwarzer and colleagues (2011) state that the main advantage of continuum models is their usefulness in prediction and explanation. However, the researchers go on to mention that the disadvantage of using continuum models is the generality of the models. Specifically, all predictor variables of the model must be addressed in health promotion intervention, which limits the model’s ability to tailor interventions to specific populations. Another disadvantage of continuum models is their inability to explain the gap between intention and behavior, and previous models have failed to adequately show that intention alone predicts behavior (Schwarzer et al., 2011).

*Stage-Based Models of Health Promotion*
The health promotion literature includes one major stage-based model: the transtheoretical model.

**Transtheoretical Model.** The transtheoretical model (TTM; Diclemente & Prochaska, 1982; Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992) consists of several components: stages of change theory, decisional balance, self-efficacy, and the processes of behavior change. The stages of change component is the most widely applied component of TTM. The five stages of change are precontemplation, contemplation, preparation, action, and maintenance. Precontemplation is the stage in which a person has no intention of engaging in behavior change. In the contemplation stage, a person intends to engage in the desired behavior change within the next 6 months. A person in the preparation stage develops a plan of action for engaging in the desired behavior change. In the action stage, a person engages in the desired action and makes the necessary changes in order to facilitate this process. Lastly, maintenance is the stage in which a person continues the behavior change over time and takes action steps to prevent relapse. The model is best described in a spiral fashion as a person cycles continuously through the stages before the behavior is adopted long-term. The decisional balance component of TTM involves weighing the pros and cons of engaging in the desired behavior. Self-efficacy, as described previously, refers to a person’s belief in his or her ability to engage in the desired action. The last component of TTM postulates 10 processes of change including five experiential and five behavioral processes. The experiential processes are consciousness raising (learning more about oneself and the desired behavior), dramatic relief (expressing feelings about problem areas and anticipated solutions), self-reevaluation (assessing one’s feeling and thoughts in relation to the problem/desired behavior), environmental reevaluation (assessing how one’s problem impacts the physical environment), and self-liberation (committing to the desired
behavior involving one’s belief in his or her ability to change). The behavioral processes are helping relationships (utilizing a support system), counterconditioning (substituting problem behavior with desired behavior), reinforcement management (rewarding oneself for engaging in the desired behavior), stimulus control (avoiding triggers for problem behaviors), and social liberation (increasing substitutions for the problem behavior within one’s social environment). The constructs of decisional balance, self-efficacy, and processes of change influence movement throughout the stages of change.

**Empirical evidence.** TTM has been useful in predicting people’s engagement in health-promoting behaviors, specifically smoking cessation and physical activity/exercise. Callaghan et al. (2002) showed in a study of Chinese youths that physical activity/exercise and self-efficacy increased as participants cycled through the stages of change. More recently, Bezyak, Berven, and Chan (2011) found that TTM accounted for 27% of the variance in physical activity/exercise for persons with severe mental illness.

**Advantages and Disadvantages of Stage Models.** In describing the advantages and disadvantages of stage-based models of health behavior change, Schwarzer (2008) makes several comments, including “stage is a construct, not nature”; “we invent the notion of stages to help understand how people change, and to provide better treatment to those who have difficulties in changing their behaviors”; “we construct stages to open another window that allows for a different view on the change process”; and “the question is not whether stages truly exist, but whether stage is a useful construct” (p. 85).

**Health Action Process Approach Model of Health Promotion**

The Health Action Process Approach (HAPA) model is a hybrid model combining aspects of SCT (Bandura, 1997), TRA/TPB (Ajzen & Fishbein, 1980), and stages of change.
theory (Prochaska, DiClemente, & Norcross, 1992) to predict whether or not individuals engage in health-promoting behavior. Schwarzer (2008) states that “HAPA not only serves to predict cognitive and behavioral outcomes, it also helps to better understand the mechanisms of health behavior change, and it provides a template for innovative interventions” (p. 91). The HAPA model specifies that engaging in health-promoting behaviors is a process consisting of a motivational phase and a volitional phase (Chiu, Lynch, Chan, & Berven, 2011).

**Motivational Phase.** In the motivational stage of the HAPA model, a person formulates an intention to act (Schwarzer, 2001, 2008). Risk perception, outcome expectancy, and perceived self-efficacy are predictors in this phase. Risk perception involves the perceived severity of threats to one’s health including vulnerability and susceptibility. An example of risk perception in a person with HIV may be the threat of an increased viral load by not adhering to the prescribed medication regimen. Risk perception alone is insufficient for developing intent to change health behavior. In fact, several studies have demonstrated that risk perception alone is a poor predictor of behavior change (Schwarzer, 2001). However, risk perception does enable a person to begin the process of contemplating and weighing the pros and cons of behavior change (Schwarzer, 2001, 2008).

Outcome expectancy further elaborates on the balancing of the pros and cons to behavior change. A person with HIV may weigh the pros of a high CD4 count and low viral load and the cons of medication side effects. Perceived self-efficacy involves people’s belief in their ability to execute the intended action. Specifically, action or pre-action self-efficacy is central at this stage. Action self-efficacy refers to people’s optimistic belief in their ability to take action. People with high action self-efficacy imagine success in implementing behavior change (e.g., taking all medication as prescribed and feeling healthy), while individuals with low action self-
efficacy imagine failures (e.g., not taking medications as directed and feeling ill). In the formulation of people’s intent to change behavior, perceived self-efficacy and outcome expectancy work in sync. As such, action self-efficacy and outcome expectancy are the primary variables involved in motivating change. As a caveat, if the person has no experience with the desired behavior, outcome expectancy, not action self-efficacy, emerges as the strongest direct predictor of intention (Schwarzer, 2001, 2008).

**Volitional Phase.** In the volitional phase, people’s intent to change their behavior is transformed into a plan of action (Schwarzer, 2001, 2008). After initiating the desired action, there is a need for maintenance. Thus, the volitional phase involves self-regulatory skills and strategies to maintain action or behavior change. To achieve action and maintenance, this phase entails planning (action and coping) and perceived self-efficacy (maintenance and recovery). Action planning determines when, where, and how the desired action will occur. Coping planning addresses potential barriers and mechanisms for overcoming those barriers. Maintenance or coping self-efficacy refers to “optimistic beliefs about one’s capability to deal with barriers that arise during the maintenance period” (Schwarzer, 2008, p. 8). Recovery self-efficacy refers to a person’s belief in his or her ability to recoup from setbacks that occur in the change process, or to “get back on track after being derailed” (p. 8).

**Empirical Evidence Supporting the HAPA Model**

Much empirical evidence exists supporting the predictive ability of the HAPA model for a variety of behavior changes. The following sections provide detailed information about these studies.

**Hygienic food handling.** Mullan, Wong, and O’Moore (2010) examined predictors of hygienic food handling behavior using the HAPA model with the added variable of past
behavior. Participants completed questionnaires assessing variables of the model at two time intervals, with a 4-week time lag. The researchers tested three models: a model using the motivational components of HAPA, a model using the motivational and volitional components of HAPA, and a model using the motivational and volitional components of HAPA along with the added variable of past behavior. Using structural equation modeling, the motivational model revealed intention as a significant predictor of hygienic food handling behavior ($\chi^2 = 12.1, df = 6, p < .059, CFI = .965, TLI = .878, RMSEA = .097$), with (a) outcome expectancy, risk awareness, and self-efficacy explaining 30% of the variance in intention, and (b) intention accounting for 36% of the variance in behavior. The motivational/volitional model revealed that intention was a significant predictor of planning but not of behavior, with no expected mediational effect of planning between intention and behavior ($\chi^2 = 54.0, df = 18, p < .000, CFI = .888, TLI = .719, RMSEA = .136$). However, this model, with the additional variables of planning/maintenance and recovery self-efficacy, accounted for 39% of the variance in behavior. Lastly, the motivational/volitional model with the inclusion of past behavior revealed past behavior as a strong predictor of intention and behavior ($\chi^2 = 65.3, df = 20, p < .000, CFI = .885, TLI = .685, RMSEA = .144$); however, this model did not fit the data as well as the previously mentioned models. Thus, the researchers concluded that the motivational model was the best fit and that motivational factors carry more weight than volitional factors do for hygienic food handling behavior.

Chow and Mullan (2009) used the HAPA model to predict food hygiene, with a specific focus on social factors (subjective norms and social support) and past behavior as additional variables to expand the original models. Participants responded to questionnaires assessing the constructs at baseline and 1 week later. Using linear regression, the original model accounted for
30.8% of the variance in intention and 17% of the variance in behavior. Using hierarchical regression, the expanded model, which included those additional variables, accounted for 54.3% of the variance in intention and 38.8% of the variance in behavior.

**Condom use.** Due to the high risk of HIV infection among men who have sex with men (MSM), Teng and Mak (2011) conducted a study applying the HAPA model to condom use behavior for MSM in Hong Kong. These men ($N = 410$) completed questionnaires assessing variables of the HAPA model and sexual behaviors and then were contacted for follow-up 1 month later for a brief phone interview assessing sexual behaviors ($N = 217$). Using structural equation modeling, results revealed a goodness of fit of the HAPA model to the data ($\chi^2 = 300.71, df = 111, p < .001$, CFI = .95, NNFI = .93, RMSEA = .065). Evidence shows that condom use at follow-up was predicted by planning, maintenance self-efficacy, and intention (predicted by action self-efficacy, outcome expectancy, and risk perception) reported at time 1, explaining 11.6% of the variance. Action and coping planning, combined as a single variable, mediated intention and condom use and was the best predictor of condom use. This study was unique in that it revealed that the variables of the HAPA model may work well across cultures.

**Low-risk, single-occasion drinking.** Through the use of hierarchical multiple regression analysis to test the HAPA model for low-risk, single-occasion drinking, constructs of the HAPA model and past drinking frequency accounted for 29% ($p < .0001$) of the variance in drinking behavior among 128 female undergraduate students (Murgraff, McDermott, & Walsh, 2003). Significant predictors included action self-efficacy, action planning, and past behavior, while surprisingly, social barriers and intention were not significant, which has implications for interventions shifting the focus from solely intent to more proximal determinants of behavior.
Specifically, based on this study, interventions should focus on action self-efficacy and action planning.

**Influenza vaccination.** Payaprom, Bennett, Alabaster, and Tantipong (2011) conducted a study using the HAPA model as a basis for creating an educational leaflet and subsequent intervention to increase influenza vaccinations among high-risk Thai adults. The control group received the standard governmental intervention leaflet without any intervention. However, those persons in the HAPA intervention group showed, with the use of t-tests and ANCOVAs, greater change in risk perception, outcome expectancy, self-efficacy, and intention between times 1 and 2. With logistic regression, vaccination behavior was predicted by perceived risk, perceived severity of influenza, outcome expectancy, intention, action planning, and self-efficacy in coping with vaccine side effects and for arranging a time and transportation for receiving the vaccine. The data in this study showed strong associations between vaccination behavior and intention (odds ratio [OR] = 3.89, \( p < .001 \)) and self-efficacy for arranging time and transportation (OR = 1.70, \( p < .05 \)). Self-efficacy for arranging time and transportation mediated intentions and vaccination, but intentions still had a strong direct effect. Additionally, linear regression was used to predict intentions with risk perception, outcome expectancy, and self-efficacy explaining 46% of the variance in intention (adjusted \( R^2 = .46, F = 27.823, p < .001 \)). In this analysis, self-efficacy for arranging time and transportation was also a mediator of intentions (dependent variable) and planning (independent variable). This study reveals that the HAPA model can be used as a basis for psychoeducational interventions in health communication.

**Testicular self-examination.** Barling and Lehmann (1999) used the HAPA model to assess testicular self-examination behavior in Australian college students. Students completed questionnaires assessing the variables of the HAPA model and knowledge about testicular cancer
over a 2-day period. Using logistic regression, results revealed that statistically significant predictor variables of testicular self-examination were intention ($p < .001$), outcome expectancy ($p < .05$), self-efficacy ($p < .05$), and knowledge ($p < .05$), with intention being the most significant predictor of testicular self-examination behavior.

**Smoking cessation.** Williams, Herzog, and Simmons (2011) conducted a partial test of the HAPA model addressing risk perception and motivation to quit smoking based on the assumption that persons with low motivation to quit smoking (nonintenders) will have lower scores on measurements of risk perception than those with medium to high motivation to quit (intenders). Risk perception was operationalized as absolute risk (likelihood of developing certain medical complications as a result of smoking) and relative risk (comparison of self to others on the likelihood of developing certain medication complications as a result of smoking). Participants responded to questions operationalizing the stages of change (distinguishing among precontemplation, contemplation, and preparation), contemplation (11-point Likert-type rating scale ladder ranging from low motivation to high motivation for smoking cessation), and risk perception (absolute versus relative risk). Through ANOVA, the results revealed that nonintenders have significantly lower risk perception than intenders do, with main effects distinguished by absolute versus relative risk on the measures for stages of change and the contemplation ladder.

**Physical activity/exercise.** Perrier, Sweet, Strachan, and Latimer-Cheung (2012) evaluated the goodness of fit of the HAPA model for sport participation with individuals with acquired physical disabilities. The researchers expanded the model to include athletic identity as a predictor of intention to engage in sports. Participants completed questionnaires assessing constructs of interests at 2 time intervals, with a 2-week time lag. Structural equation modeling
revealed a goodness of fit of the expanded model with the data ($\chi^2 = 814.70, p < .001, \text{CFI} = .96, \text{SRMR} = .063, \text{RMSEA} = .049$). Results showed that constructs of the HAPA model explained 15% of the variance in sport participation. When the additional predictor of athletic identity was added to the model, it accounted for 18% of the variance in sport participation.

Scholz, Keller, and Perren (2009) conducted a study using the entire HAPA model to assess within-person associations of its variables using multilevel modeling in order to predict intention and physical exercise behavior. University students completed an online questionnaire every 2 weeks during their first semester, for a total of 9 measurement points. Predictors of intention at the intrapersonal level were positive outcome ($b = 0.15, p < .001; \text{Pseudo } R^2 = .04$) and self-efficacy ($b = 0.40, p < .001; \text{Pseudo } R^2 = .05$). Predictors of physical exercise at the intrapersonal level were intentions ($b = 0.25, p < .001; \text{Pseudo } R^2 = .07$), self-efficacy ($b = 0.15, p < .001; \text{Pseudo } R^2 = \text{not computed}$), and action control ($b = 0.15, p < .001; \text{Pseudo } R^2 = .08$). A unique feature of this study was that risk awareness did not predict intention, and action planning did not predict physical exercise.

Caudroit, Stephan, and Le Scanff (2011) examined social cognitive predictors of physical activity/exercise in older adults who were retired; the researchers used the HAPA model as a framework to address the gap research addressing this model for older adult populations. Participants responded to survey questions addressing variables of the HAPA model at baseline and after a 6-month time lag. Path analysis revealed a goodness of fit of the HAPA model to the data ($\chi^2 = 14.56, df = 120, p = .15, \text{CFI} = .98, \text{TLI} = .97, \text{RMSEA} = .06$). Results indicated that action self-efficacy ($\beta = .64$) and risk perception ($\beta = .15$) were predictors of intention. Even though outcome expectancy was not a statistically significant predictor as expected, the three variables accounted for 48% of the variance in intention. Intention for physical activity/exercise
(β = .39) and maintenance (coping) self-efficacy (β = .33) were predictors of physical activity/exercise behavior, accounting for 39% of the variance. Surprisingly, this study revealed that planning was not a mediator of intention and behavior as specified in the HAPA model. While providing further evidence supporting the utility of the HAPA model, these researchers suggested that the HAPA model may need to be adjusted or adapted to fit the needs of specific groups.

Using path analysis, Chiu, Lynch, Chan, and Berven (2011) evaluated the HAPA model as a motivational model of physical activity/exercise self-management for persons with multiple sclerosis. After respecifying the model, these researchers found a good fit between the model and the data (χ² = 23, p < .01, GFI = .92, CFI = .93, NFI = .91). Predictors of physical activity/exercise self-management behavior in persons with multiple sclerosis included recovery self-efficacy (β = .15), action and coping planning (β = .38), and perceived barriers (β = -.11), with outcome expectancy (β = .38) predicting intention. Mediators of intention and physical activity/exercise self-management behavior included action and coping planning. Evidence showed that the model accounted for 38% of the variance in physical activity/exercise self-management behavior and 18% of the variance in intention.

Barg and colleagues (2012) used the HAPA model to examine predictors of physical activity/exercise in middle-aged women. Participants responded to questionnaires operationalizing constructs of the HAPA model and physical activity/exercise at baseline and after a 4-week time lag (planning and maintenance self-efficacy only) and a 12-week time lag (physical activity/exercise only). With structural equation modeling, results of the hypothesized model indicated a goodness of fit with the data (χ² = -497.59, df = 286, p < .01, TLI = -.90, CFI = -.92, RMSEA = -.07), accounting for 57% of the variance in intention, 56% of the
variance in planning, and 15% of the variance in physical activity/exercise behavior. Specifically, action self-efficacy ($\beta = 0.69$) was the best predictor of intention, and maintenance self-efficacy was the best predictor of planning ($\beta = 0.73$) and behavior ($\beta = 0.47$). Surprisingly, planning did not predict behavior in this study.

**Healthy diet.** Schwarzer and Fuchs (1996) examined the interaction between self-efficacy (belief in one’s ability to commit to and persist in eating healthy foods), outcome expectancy (reducing risk of heart complications/failure), and risk perception (likelihood of having a heart attack or stroke) in a 6-month interval, showing that the model accounted for 21% of the variance in men and 20% of the variance in women for healthy eating behavior, with intention and self-efficacy as significant predictors.

Using path analysis, Chiu, Lynch, Chan, and Rose (2012) evaluated the HAPA model as a motivational model of dietary self-management for persons with multiple sclerosis. They found that the model fit the data reasonably well ($\chi^2 = 67.01, p < .001$, GFI = .95, CFI = .95, NFI = .90, RMSEA = .07). Evidence showed that the model accounted for 15% of the variance in dietary self-management behavior. Predictors of dietary self-management behavior in persons with multiple sclerosis included recovery self-efficacy ($\beta = .27$) and action and coping planning ($\beta = .17$). Predictors of intention included action self-efficacy ($\beta = .31$), outcome expectancy ($\beta = .18$), risk perception ($\beta = .27$), and social support ($\beta = .16$). Mediators of intention and dietary self-management behavior included action and coping planning.

**Criticisms of HAPA.** Even with the uniqueness of the HAPA model, some researchers criticize its theoretical structure. For instance, Leventhal and Mora (2009) express concerns with the model “straddling two approaches to the analysis of health and illness behavior” including (a) the use of “indicators to predict behavioral outcomes” and (b) “the assessment and manipulation
of variables to understand the processes underlying the performance of health behavior” (p. 52).
They further declare that the model is incomplete due to its inability to fully explain the underlying processes of health action. These researchers pose the following 4 questions for critical consideration of the HAPA model: (a) Is the model descriptive, predictive, or process-based? (b) Are the volitional components completely absent from the motivational stage and vice versa? (c) How often (i.e., always, sometimes, rarely) are intentions involved in the underlying mechanism for health behavior (change)? and (d) Do persons with or without CID evaluate efficacy for health behavior (change) using the same criteria as health practitioners and researchers? Leventhal and Mora encourage future researchers to consider these criticisms in studies to evaluate and/or modify the HAPA model.

Refinement and Extension of HAPA for African Americans with HIV/AIDS

According to Sutton (2008), adding additional determinants (predictors) of behavior (e.g., HIV severity) may not enhance the intention-behavior relationship, but it does increase the proportion of variance explained. For this reason, in this study an expanded version of the HAPA model will be tested to determine whether it is useful in predicting physical activity/exercise behavior for African Americans living with HIV.

The expanded model includes disease-specific variables (i.e., symptom severity), and culturally sensitive health variables (i.e., spirituality). The disease-specific variables were described in chapter 1; the following section describes the inclusion of culturally sensitive health variables.

It is important to address both spirituality and religiosity in the expanded model because of measurement concerns in the research literature about the difficulty in clearly distinguishing between the two constructs (Kapussckinski & Masters, 2010). For instance, religiosity may be
considered external (e.g., religious practices), while spirituality may be considered internal (e.g., belief system). Nelson, Rosenfeld, Breitbart, and Galietta (2002) summarize distinctions between the two constructs provided in the research literature:

Spirituality can exist both within and outside of a religious framework, and many individuals who consider themselves quite spiritual may not adhere to any particular religion. Religion [religiosity], on the other hand, denotes an organized system of beliefs, practices, and ways of worship. Although religion may be a method to channel or direct the expression of spirituality, some religious individuals focus less on the spiritual aspects of religion than on the tradition, social interactions, and rituals. (p. 214)

Additionally, there is little consensus in the literature on the mechanism by which spirituality and religiosity affect health outcomes (Koenig, 2004). To address this issue, Kudel and colleagues (2011) expanded and tested Koenig’s model of spirituality and religiosity on health-related outcomes. The model posits that persons “who reported increased levels of spirituality/religiosity since diagnosis (of any chronic illness) utilize religious coping and thereby derive social support, which in turn positively impacts their psychological function, and then, in turn, their physical function” and “spirituality/religiosity levels indirectly influence other domains” such as social support through coping (p. 93). The results of the study show that spirituality and religiosity predicted an increase in religious coping, influencing social support, influencing depressed mood, influencing physical function, and subsequently influencing health status.

A literature review of over 250 studies evaluating the link between spirituality and health shows consistently positive correlations between health variables (e.g., health conditions) and spirituality (Levin & Schiller, 1987). Research shows that a strong sense of spirituality has a
protective health benefit, even when individuals engage in unhealthy behaviors such as smoking (Udermann, 2000).

As culturally sensitive health variables, spirituality and religiosity have been well-documented in the literature on African American culture (Bowen-Reid & Harrell, 2002), and are associated with coping with HIV, psychological health, and HRQoL in persons with HIV/AIDS. Research shows that persons with HIV/AIDS use spirituality as a way to cope and give meaning and purpose to their lives post-diagnosis (Hall, 1998; Siegel & Schrimshaw, 2002). Additionally, in persons with HIV/AIDS, spirituality and religiosity are associated with longer survival, more health-promoting behaviors, lower levels of distress and the stress hormone cortisol (Ironson et al., 2002), better CD4 counts (Woods, Antoni, Ironson, & Kling, 1999), and empowerment and faith-based coping strategies (Pargament, Koenig, & Perez, 2000). Importantly, some research evidence demonstrates the harmful effects of spirituality and religiosity on persons with HIV/AIDS, because they may be judged and not accepted by their religious institutions and communities due to lifestyle (e.g., homosexuality) or stigma (Brown, Macintyre, & Trujillo, 2003).

Even though previous studies show the impact of spirituality/religiosity on persons with CID, very few studies have addressed the impact of spirituality/religiosity along with other motivational and volitional variables on health-promoting behavior and HRQoL among African Americans with HIV/AIDS (Cotton et al., 2006). Methodological issues in previous health and spirituality/religiosity studies include small sample sizes, single versus multisite recruitment, and the use of a single measure to assess both spirituality and religiosity without a clear distinction between the two constructs (Schwartzberg, 1993).
Conclusion

This review of the literature has provided evidence for the use of the HAPA model as a framework for predicting physical activity/exercise and HRQoL in African Americans living with HIV/AIDS. Expanding the model to include disease-specific and culturally specific health variables has the potential to explain greater variance in the specified outcome measures. Evaluating an expanded version of HAPA as a physical activity/exercise model for African Americans with HIV/AIDS appears to be warranted.
CHAPTER THREE

Methodology

Research Design

A quantitative descriptive design (Heppner, Wampold, & Kivlighan, 2008) utilizing a multiple regression and correlational analysis was used to evaluate whether variables of the expanded Health Action Process Approach (HAPA) model will predict exercise behavior and health-related quality of life for African Americans living with HIV/AIDS.

Procedure

Case management agencies providing services to African Americans living with HIV/AIDS were contacted to determine their interest in assisting with this project. Three agencies in Baton Rouge expressed interest in participating in this study: (a) Volunteers of America Greater Baton Rouge, (b) HIV and AIDS Alliance of Region II, and (c) Family Services of Greater Baton Rouge. After permission was granted from these agencies, an application to the Institutional Review Board at the University of Wisconsin-Madison was submitted and subsequently determined exempt from full review. After receipt of the exemption letter (see Appendix A), these agencies were contacted to schedule mutually agreed upon days and times for data collection.

To be included in the study, participants were to have met the following criteria: (a) be age 18 years or older, (b) be identified as African American, and (c) have a diagnosis of HIV or AIDS. A flyer listing these criteria was placed in the waiting area of each agency (see Appendix B). Participants volunteered to participate in the survey after viewing the flyer. The researcher was given access to a conference room or spare office at each agency for administration of the surveys. Potential participants were given a study information sheet to review (see Appendix C).
After reading the sheet, potential participants decided whether or not to continue with the study and take the survey. Due to confidentiality concerns, no written consent form was collected. The receipt of a completed survey packet was evidence that persons agreed to participate. Each survey was completely anonymous; no identifying information was collected.

Participants completed a paper and pencil survey (see Appendix D) that took approximately 30 minutes to complete. It included a demographic questionnaire and brief instruments, with demonstrated psychometric properties, assessing each variable in the expanded HAPA model. Due to the length of the survey and the time and effort it took to complete it, participants received a $20 gift card to Wal-Mart as an incentive.

**Sampling and Participants**

A total of 110 surveys were completed. All participants were recruited from the HIV case management agencies in the Baton Rouge area. Participants volunteered to participate in the study and to complete the HAPA survey after reviewing a brief description of the study and the inclusion criteria in the commons area of the agency.

Descriptive data for the participants in this study are presented in Table 3.1. The age range for participants was 20 to 66 years ($M = 46.1$, $SD = 11.0$). There were 58 women (52.7%), 49 men (44.5%), and 1 transgender (.9%), with 2 persons (1.8%) who did not report their gender. The majority of participants identified their sexual orientation as straight ($n = 81$, 73.6%), followed by gay ($n = 19$, 17.3%), and bisexual ($n = 5$, 4.5%), with 5 participants (4.5%) not reporting their sexual orientation. Most participants were single ($n = 75$, 68.2%); the rest were married or in a significant long-term relationships ($n = 16$, 14.5%), divorced ($n = 12$, 10.9%), or widowed ($n = 7$, 6.4%).
Most participants graduated from high school ($n = 30, 27.3\%$), attended some college ($n = 25, 22.7\%$), graduated from college ($n = 3, 2.7\%$), or attended graduate school ($n = 6, 5.5\%$). However, some participants only completed some high school ($n = 31, 28.2\%$), graduated from grade school only ($n = 7, 6.4\%$), completed only some grade school ($n = 6, 5.5\%$), or did not respond to the question ($n = 2$). Employment status among participants varied: 20 participants (18.2\%) were employed full-time, 10 participants (9.1\%) were employed part-time, 36 participants (32.7\%) were unemployed and seeking employment, 34 participants (30.9\%) were retired or not seeking employment, and 4 participants (3.6\%) were volunteers; 6 participants (5.5\%) did not report their employment status. As for employment type, participants were currently or most recently working as service workers ($n = 36, 32.7\%$), laborers ($n = 24, 21.8\%$), professionals ($n = 14, 12.7\%$), clerical salespersons ($n = 6, 5.5\%$), managers ($n = 5, 4.5\%$), students ($n = 5, 4.5\%$), operators ($n = 4, 3.6\%$), or craftsmen ($n = 4, 3.6\%$), with 12 participants not reporting their employment type. The average annual household income for participants ranged from $0 to $48,000 ($M = $10,745, $SD = $7, 798). Participants reported their health insurance as follows: Medicaid ($n = 59, 53.6\%$), Medicare ($n = 9, 8.2\%$), private insurance through employment ($n = 6, 5.5\%$), or private insurance through other means ($n = 8, 7.3\%$); 28 participants (25.5\%) did not report health insurance coverage.

Although all participants self-identified as having a diagnosis of HIV/AIDS, 62 participants (56.4\%) reported being asymptomatic, 31 participants (28.2\%) reported experiencing symptoms, 14 participants (12.7\%) reported a diagnosis of AIDS, and 3 participants (2.7\%) did not provide specific information about their HIV status. Participants’ self-reported CD4 T-cell count ranged from 8 to 1400 ($M = 573.7, SD = 321.7$); and their viral load ranged from undetectable to 49,000 copies ($M = 1434.4, SD = 7043.7$). It is important to mention that only 66
participants reported their CD4 T-cell count; 65 participants reported their viral load. Lastly, participants’ body mass index was calculated based on their height and weight: the largest percentage of participants were in the obese category (40%), followed by overweight (30.9%), normal weight (25.5%), and underweight (2.7%).

**Instruments**

A single instrument was used to assess each variable in the model as shown in Table 3.2. The following sections provide a description of each measure.

**HIV symptom severity.** Symptoms were measured with the updated HIV Symptom Index (Justice et al., 2001), used to operationalize symptoms related to HIV infection and the extent to which the person was bothered by the symptoms. It consists of 20 items (e.g., “fatigue or loss of energy”), and each item is rated on a 5-point Likert scale (0 = I do not have the symptom, 1 = it doesn’t bother me, 2 = it bothers me a little, 3 = it bothers me, 4 = it bothers me a lot). Scores for the HIV symptoms range from 0 to 100, with higher scores reflecting more bothersome symptoms. Construct validity for this instrument has been supported (Justice et al., 2001). Cronbach’s alpha coefficient for the scale in the present study was computed to be .93.
Table 3.1
Participant Demographic Information and HIV Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (%)</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>46.07 (11.02)</td>
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<tr>
<td>Gender</td>
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<tr>
<td>Male</td>
<td>49 (44.5%)</td>
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<tr>
<td>Female</td>
<td>58 (52.7%)</td>
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<td>Transgender</td>
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<tr>
<td>No response</td>
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</tr>
<tr>
<td>Education level</td>
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</tr>
<tr>
<td>Grade school graduate</td>
<td>7 (6.4%)</td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>31 (28.2%)</td>
<td></td>
</tr>
<tr>
<td>High school graduate</td>
<td>30 (27.3%)</td>
<td></td>
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<tr>
<td>Some college</td>
<td>25 (22.7%)</td>
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<tr>
<td>College graduate</td>
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<tr>
<td>Graduate school</td>
<td>6 (5.5%)</td>
<td></td>
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<tr>
<td>No response</td>
<td>2 (0.0%)</td>
<td></td>
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<tr>
<td>Current or most recent career</td>
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<td></td>
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<tr>
<td>Laborer</td>
<td>24 (21.8%)</td>
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</tr>
<tr>
<td>Student</td>
<td>5 (4.5%)</td>
<td></td>
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<tr>
<td>Service worker</td>
<td>36 (32.7%)</td>
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<tr>
<td>Operator</td>
<td>4 (3.6%)</td>
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<tr>
<td>Craftsman</td>
<td>4 (3.6%)</td>
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<tr>
<td>Clerical salesperson</td>
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<td>Manager</td>
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<td>Professional</td>
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</tr>
<tr>
<td>Employed full-time</td>
<td>20 (18.2%)</td>
<td></td>
</tr>
<tr>
<td>Employed part-time</td>
<td>10 (9.1%)</td>
<td></td>
</tr>
<tr>
<td>Unemployed/Seeking</td>
<td>36 (32.7%)</td>
<td></td>
</tr>
<tr>
<td>Retired/Not seeking</td>
<td>34 (30.9%)</td>
<td></td>
</tr>
<tr>
<td>Volunteer part-time</td>
<td>4 (3.6%)</td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td>6 (0.1%)</td>
<td></td>
</tr>
<tr>
<td>Household income</td>
<td>$10,745 ($7,798)</td>
<td></td>
</tr>
<tr>
<td>Health Insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Insurance-Employer</td>
<td>6 (5.5%)</td>
<td></td>
</tr>
<tr>
<td>Private insurance-Other</td>
<td>8 (7.3%)</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Medicare</td>
<td>9</td>
<td>(8.2%)</td>
</tr>
<tr>
<td>Medicaid</td>
<td>59</td>
<td>(53.6%)</td>
</tr>
<tr>
<td>No Response</td>
<td>58</td>
<td>(52.7%)</td>
</tr>
</tbody>
</table>

**Relationship status**
- Single: 75 (68.2%)
- Married/Long-term relationship: 16 (14.5%)
- Divorced: 12 (10.9%)
- Widowed: 7 (6.4%)

**Sexual Orientation**
- Straight: 81 (73.6%)
- Gay: 19 (17.3%)
- Bisexual: 5 (4.5%)
- No response: 5 (4.5%)

**Body Mass Index**
- Underweight: 3 (2.7%)
- Normal weight: 28 (25.5%)
- Overweight: 34 (30.9%)
- Obese: 44 (40.0%)
- No response: 1 (0.0%)

**HIV Status**
- Diagnosis of HIV/AIDS: 110 (100.0%)
- HIV+ Symptomatic: 31 (28.2%)
- HIV + Asymptomatic: 62 (56.4%)
- AIDS: 14 (12.7%)
- No Response: 3 (0.0%)

**HIV Biomarkers**
- CD4 T-cell count: 574 (322)
- Viral load: 1434 (7044)
**Risk perception.** Risk perception was measured with the Health/Safety Risk Perceptions Scale (HRPS), a subscale of the Domain Specific Risk-Taking (DOSPERT) used to operationalize the likelihood that a person will engage in risky health behaviors, including the perceived magnitude of risk associated with the behavior (Weber, Blais, & Betz, 2002; Blais & Weber, 2006). The scale consists of 5 items (e.g., “engaging in unprotected sex”). Each item is rated on a 5-point Likert scale ranging from 1 (not at all risky) to 5 (extremely risky). Scores on this measure range from 5 to 25, with higher scores reflecting self-perception of higher risk. Cronbach’s alpha has been reported to range from .76 to .81 for this subscale. Convergent and discriminate validity have been established. Cronbach’s alpha coefficient for the scale in the present study was computed to be .83.

**Intention.** Intention was measured by the Health Behavior Intention Scale (HBIS), which is used to operationalize a person’s intention for engaging in health-promoting behavior (Renner & Schwarzer, 2005). It consists of 10 items (e.g., “I intend to live a healthier life”). Each item is rated on a 7-point Likert scale ranging from 1 (do not intend at all) to 7 (strongly intend). Scores on this measure range from 10 to 70, with higher scores reflecting greater intention for engaging in health-promoting behaviors. Cronbach’s alpha has been reported by the developer of the instrument as .65. Cronbach’s alpha coefficient for the scale in the present study was computed to be .71.

**Outcome expectancy.** Outcome expectancy was measured with the Outcome Expectations for Exercise (OEE) Scale, used to operationalize outcome expectations for exercise (Resnick, Zimmerman, Orig, Furstenberg, & Magaziner, 2000). It consists of 9 items (e.g., “physical activity and exercise make me feel better physically”). Each item is rated on a 5-point
Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Scores on this measure range from 9 to 45, with higher scores reflecting less outcome expectations for engaging in physical activity/exercise. Cronbach’s alpha has been reported as .89. Cronbach’s alpha coefficient for the scale in the present study was computed to be .92.

**Action self-efficacy.** Action self-efficacy was measured with the Action Self-Efficacy Scale for Exercise, used to operationalize action self-efficacy for engaging in regular physical activity/exercise (Renner & Schwarzer, 2005). It consists of 2 items (e.g., “I can manage to carry out my exercise intentions, even when I have worries and problems”). Each item is rated on a 4-point Likert scale ranging from 1 (very uncertain) to 4 (very certain). Scores on this measure range from 2 to 8, with higher scores reflecting greater action self-efficacy. Cronbach’s alpha has been reported as .79. Cronbach’s alpha coefficient for the scale in the present study was computed to be .83.

**Maintenance self-efficacy.** Maintenance self-efficacy was measured by the Maintenance Self-Efficacy Scale for Exercise, used to operationalize a person’s perception of his or her maintenance self-efficacy for engaging in regular exercise (Luszczynska & Sutton, 2006). It consists of 4 items (e.g., “I am confident that I am able to do physical exercises regularly, even if I do not see the immediate effects of exercise”). Each item is rated on a 4-point Likert scale ranging from 1 (not at all true) to 4 (exactly true). Scores on this measure range from 4 to 16, with higher scores reflecting greater maintenance self-efficacy. Cronbach’s alpha has been reported as .81. Cronbach’s alpha coefficient for the scale in the present study was computed to be .82.

**Action planning and coping planning.** Action and coping planning were measured with the Action Planning and Coping Planning Scale for Exercise, used to operationalize action and
coping planning for exercise (Sniehotta, Schwarzer, Scholz, & Schuz, 2005). It consists of 9 items and 2 subscales: the action planning subscale, which has 5 items (e.g., “I have concrete plans for when to exercise”), and the coping planning subscale, which has 4 items (e.g., “I have concrete plans what to do if something intervenes”). Each item is rated on a 4-point Likert scale ranging from 1 (not at all true) to 4 (exactly true). Scores on this measure range from 9 to 36, with higher scores reflecting more action and coping planning. Cronbach’s alpha has been reported as .92 and .90 for the action and coping planning subscales, respectively. Cronbach’s alpha coefficient for the scale in the present study was computed to be .95.

**Recovery self-efficacy.** Recovery self-efficacy was measured with the Recovery Self-Efficacy Scale for Exercise, used to operationalize recovery self-efficacy for engaging in regular exercise (Luszczynska & Sutton, 2006). It consists of 3 items (e.g., “I am sure I can be physically active again regularly, even if I had failed to pulled myself together to exercise”). Each item is rated on a 4-point Likert scale ranging from 1 (not at all true) to 4 (exactly true). Scores on this measure range from 3 to 12, with higher scores reflecting greater recovery self-efficacy. Cronbach’s alpha has been reported as .85. Cronbach’s alpha coefficient for the scale in the present study was computed to be .68.

**Perceived barriers.** Perceived barriers were measured with the Barriers to Health Promoting Activities for Disabled Persons Scale, used to operationalize a person’s perception of barriers to engaging in health-promoting behaviors (Becker, Stuifberg, & Sands, 1991). It consists of 18 items and 3 subscales: intrapersonal barriers (e.g., “too tired”), interpersonal barriers (e.g., “interferes with other responsibilities”), and environmental barriers (e.g., “lack of transportation”). Each item is rated on a 4-point Likert scale ranging from 1 (never) to 4 (routinely). Scores on this measure range from 18 to 72, with higher scores reflecting more
perceived barriers. Cronbach’s alpha has been reported as .82. Cronbach’s alpha coefficient for the scale in the present study was computed to be .89.

**Social support.** Social support was measured with the Friend and Family Support for Exercise Habits Scale, used to operationalize social support from friends and family for engaging in physical activity/exercise (Sallis et al., 1987). The scale consists of 20 items and 2 subscales: (a) friend support, which has 5 items (e.g., “My friend gave me helpful reminders to exercise”) and (b) family support. The family support subscale has 2 factors: participation and involvement, which has 12 items (e.g., “My family member gave me encouragement to stick with my exercise program”), and rewards and punishments, which has 3 items (e.g., “My family member gave me rewards for exercising”). Each item is rated on a 5-point Likert scale ranging from 1 (none) to 5 (very often). Scores on this measure range from 20 to 100, with higher scores reflecting more friend and family support for engaging in physical activity/exercise. Cronbach’s alpha has been reported as .84 for the friend support subscale and .91 and .61 for the participation/involvement and rewards/punishments factors of the family support subscale, respectively. Cronbach’s alpha coefficient for the scale in the present study was computed to be .94.

**Spirituality.** Spirituality was measured by the Ironson-Woods Spirituality/Religiousness Index-Short Form to operationalize spiritual and religious beliefs in persons living with HIV/AIDS (Ironson, Solomon, Balbin, O’Cleirigh, et al., 2002). It consists of 22 items and 4 subscales: (a) sense of peace, which has 9 items (e.g., “my beliefs give meaning to my life”); (b) faith in God, which has 6 items (e.g., “I believe God created all things in the universe”); (c) religious behavior, which has 5 items (e.g., “I attend religious services”); and (d) compassionate view of others, which has 5 items (e.g., “my beliefs teach me to help other people who are in
need”). Each item is rated on a 4-point Likert rating scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scores on this measure range from 22 to 110, with higher scores reflecting greater spiritual and religious beliefs. Cronbach’s alpha has been reported as .96 for the total instrument and .94, .93, .85, and .87 for the subscales, respectively. Cronbach’s alpha in this study was computed to be .97.

**Physical activity/exercise.** Exercise behavior was measured by the Physical Activity Stages of Change Instrument (PASC). The PASC was developed by Nigg et al. (2005) to operationalize the concept of readiness to engage in physical activity/exercise. In the present study, the PASC was used as an outcome measure to assess the degree of engagement in physical activity/exercise. The PASC consists of 4 items (e.g., “Do you currently engage in regular physical activity?”). Items are rated on a dichotomous “yes” or “no” format. A scoring algorithm was provided by Nigg et al. to convert the scores in the 4 items to represent the degree of engagement in physical activity/exercise along a 5-point continuum: 1 (precontemplation), 2 (contemplation), 3 (preparation), 4 (action), and 5 (maintenance). The current study regarded the stages of physical activity/exercise to represent how much a person engaged in physical activity/exercise. The higher the stages, the more physical activity/exercise was being engaged in. Individuals with scores of 4 and 5 were considered actively engaged in physical activity/exercise for the purpose of this study.

**Health-related quality of life.** Health-related quality of life was measured with the MOS Short Form Health Survey (SF-12v2; Ware, Kosinski, & Keller, 1996). It consists of 8 subscales: (a) physical functioning, which has 2 items (e.g., “moderate activities, such as moving a table”); (b) role limitations-physical, which has 2 items (e.g., “accomplished less than you would like”); (c) bodily pain, which has 1 item (i.e., “how much did pain interfere with normal
work”); (d) general health, which has 1 item (i.e., “would you say your health is excellent…”); (e) vitality, which has 1 item (i.e., “did you have a lot of energy”); (f) social functioning, which has 1 item (i.e., “how much of the time has your physical health or emotional problems interfered with your social activities”); (g) role limitation-emotional, which has 1 item (i.e., “how much time have you had…problems with your work…as a result of emotional problems”); and (h) mental health, which has 2 items (e.g., “have you felt calm and peaceful”). Nine items are rated on a 5-point Likert scale from 1 (excellent) to 5 (poor); the others use a 3-point Likert-type scale from 1 (yes, limited a lot) to 3 (no, not limited at all). The items are summed as a Physical Component Summary Scale (PCS), a Mental Component Summary Scale (MCS), and a total score. The scores are standardized on a general population sample ($M = 50, SD = 10$).

Cronbach’s alpha has been reported as .87 and .82 for each component score, respectively. Cronbach’s alpha for the PCS and the MCS was computed to be .87 and .82, respectively, in the present study.
Table 3.2
Descriptive Statistics for Study Measures (N = 110)

<table>
<thead>
<tr>
<th>HAPA Variables</th>
<th>Measure</th>
<th>Response Range</th>
<th>Scoring Range</th>
<th>M</th>
<th>SD</th>
<th>α^a</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predictor Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV symptom severity</td>
<td>HIV Symptom Index</td>
<td>0-3</td>
<td>20-92</td>
<td>45</td>
<td>19</td>
<td>.93</td>
</tr>
<tr>
<td>Action self-efficacy</td>
<td>Action Self-Efficacy Scale for Exercise</td>
<td>1-4</td>
<td>2-8</td>
<td>6</td>
<td>2</td>
<td>.83</td>
</tr>
<tr>
<td>Outcome expectancy</td>
<td>Outcome Expectations for Exercise Scale</td>
<td>1-5</td>
<td>9-45</td>
<td>36</td>
<td>8</td>
<td>.92</td>
</tr>
<tr>
<td>Risk perception</td>
<td>Health/Safety Risk Perceptions Scale</td>
<td>1-5</td>
<td>5-25</td>
<td>20</td>
<td>5</td>
<td>.83</td>
</tr>
<tr>
<td>Social support</td>
<td>Friend and Family Support for Exercise Health</td>
<td>1-5</td>
<td>20-100</td>
<td>41</td>
<td>20</td>
<td>.94</td>
</tr>
<tr>
<td>Perceived barriers</td>
<td>Barriers to Health Promoting Activities for Disabled Persons Scale</td>
<td>1-4</td>
<td>18-56</td>
<td>29</td>
<td>9</td>
<td>.89</td>
</tr>
<tr>
<td>Maintenance self-efficacy</td>
<td>Maintenance Self-Efficacy Scale for Exercise</td>
<td>1-4</td>
<td>4-16</td>
<td>10</td>
<td>4</td>
<td>.82</td>
</tr>
<tr>
<td>Action and coping planning</td>
<td>Action Planning and Coping Planning Scale for Exercise</td>
<td>1-4</td>
<td>9-36</td>
<td>24</td>
<td>9</td>
<td>.95</td>
</tr>
<tr>
<td>Intention</td>
<td>Health Behavior Intention Scale</td>
<td>1-7</td>
<td>28-70</td>
<td>58</td>
<td>10</td>
<td>.71</td>
</tr>
<tr>
<td>Recovery self-efficacy</td>
<td>Recovery Self-Efficacy Scale for Exercise</td>
<td>1-4</td>
<td>3-12</td>
<td>9</td>
<td>2</td>
<td>.68</td>
</tr>
<tr>
<td>Spirituality</td>
<td>Ironson-Woods Spirituality/Religiousness Index-Short Form</td>
<td>1-5</td>
<td>22-110</td>
<td>98</td>
<td>19</td>
<td>.97</td>
</tr>
<tr>
<td><strong>Outcome Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity/exercise</td>
<td>Physical Activity Stages of Change Instrument</td>
<td>Yes or No</td>
<td>1-5</td>
<td>4</td>
<td>1</td>
<td>N/A</td>
</tr>
<tr>
<td>Health-related quality of life</td>
<td>MOS Short Form Health Survey-Physical Health</td>
<td>Varied</td>
<td>Varied</td>
<td>42</td>
<td>11</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td>MOS-Short Form Health Survey-Mental Health</td>
<td>Varied</td>
<td>Varied</td>
<td>46</td>
<td>13</td>
<td>.76</td>
</tr>
</tbody>
</table>
Data Analysis

For each instrument, scores were computed using the mean item response. The Statistical Package for Social Sciences was used for data analysis. To test the research hypotheses, data were analyzed using descriptive statistics and hierarchical multiple regression.

In this study, the primary outcome measure was physical activity/exercise measured by the PASC scores. Predictor variables were analyzed with data from the following instruments: HIV Symptom Index, Health/Safety Risk Perceptions Scale, Health Behavior Intention Scale, Outcome Expectations for Exercise Scale, Action Self-Efficacy Scale for Exercise, Maintenance Self-Efficacy Scale for Exercise, Action Planning and Coping Planning Scale for Exercise, Recovery Self-Efficacy Scale for Exercise, Barriers to Health Promoting Activities for Disabled Persons Scale, Friend and Family Support for Exercise Habits Scale, and Ironson-Woods Spirituality/Religiousness Index-Short Form.

Missing Data

Most of the measures in this study have less than 5% missing values. A simple imputation method run by PASW 18.0 was selected for handling missing data. The imputation method computes estimations based on the values of other related item variables to replace missing data. This method is preferred over case deletion since it will not decrease the sample size (i.e., statistical power loss) or affect the sample representativeness. According to Fox-Wasylyshyn and El-Masri (2005), simple imputation and multiple imputation methods will yield similar results when the missing data are less than 5%.

Hierarchical Regression Analysis

The primary analysis was conducted using hierarchical regression analysis (HRA) in order to measure the incremental variance accounted for by each predictor set. HRA was used to
determine the correlation of each predictor set and to determine the unique contribution and predictive ability of each predictor variable to the variance of the criterion variable (exercise). The change in $R^2 (\Delta R^2)$ was examined as a measure of the contribution of each predictor set in the model. Five blocks were entered: (1) severity of the HIV/AIDS symptoms; (2) spirituality, social support, and perceived barriers; (3) action self-efficacy, outcome expectancy, and risk perception; (4) intention; and (5) maintenance self-efficacy, recovery self-efficacy, and action and coping planning. This order of blocks facilitated more accurate understanding of the ability of the HAPA model to predict exercise when controlling for the other predictors in the model. Significance tests for the regression coefficients for each predictor variable were assessed at each block and at the final model to assess unique relationships to the dependent variable (exercise).

**Mediation Analysis**

Multiple regression was used to test two mediator hypotheses related to: (1) the effect of maintenance and recovery self-efficacy and action and coping planning on the relationship between intention and physical activity/exercise behavior; and (2) the effect of spirituality and physical activity/exercise on the relationship between severity of HIV/AIDS and health-related quality of life (Hoyt et al., 2008). The mediator is a variable caused by the independent variable (IV), which in turn causes the dependent variable (DV), leading to a change of magnitude of the effect of the IV on the DV, partially or completely. Mediators enable researchers to understand “why” or “how” the IV predicts or causes the DV. Baron and Kenny’s (1986) classical article on distinguishing mediators and moderators provided the approach for the current study. This decision to use the Baron and Kenny formulation follows the suggestions and arguments made by Hoyt et al. The bootstrap test (Shrout & Bolger, 2002) was conducted to assess the significance of the mediation effects.
CHAPTER FOUR

Results

The purpose of the present study was to examine the predictive ability of Ralph Schwarzer’s Health Action Process Approach (HAPA) model as a physical activity/exercise and health-related quality of life model for African Americans living with HIV/AIDS. Hierarchical regression analysis (HRA) was used to determine the amount of variance in physical activity/exercise that could be accounted for by sets of predictors representing symptom severity, contextual factors, social-cognitive health variables, intention, and action and coping planning in the HAPA health promotion model. In addition, three mediation analyses were conducted to examine the mediating effect of (a) action self-efficacy, outcome expectancy, and risk perception on the relationship between symptom severity and physical activity/exercise intention, (b) maintenance self-efficacy, recovery self-efficacy, and action and coping planning on the relationship between physical activity/exercise intention and physical activity/exercise behavior and (c) physical activity/exercise behavior on the relationship between symptom severity and health-related quality of life. The specific research questions were as follows:

Research Question 1: Do the HAPA constructs (i.e., symptom severity, contextual factors, social-cognitive health variables, and theory of planned behavior variables) predict physical activity/exercise behavior in people with HIV/AIDS?

Research Question 2: Is the relationship between symptom severity and physical activity/exercise intention mediated by action self-efficacy, outcome expectancy, and risk perception?
**Research Question 3:** Is the relationship between physical activity/exercise intention and physical activity/exercise behavior mediated by maintenance self-efficacy, recovery self-efficacy, and action and coping planning?

**Research Question 4:** Is the relationship between symptom severity and health-related quality of life mediated by physical activity/exercise behavior?

This chapter describes the results of the statistical analyses used to evaluate the primary research questions.

**Hierarchical Regression Analysis**

Hierarchical regression analysis was conducted to answer research question 1, with physical activity/exercise behavior as the dependent variable and five sets of HAPA variables entered as predictors in sequential steps: (1) severity of the HIV/AIDS symptoms; (2) spirituality, social support, and perceived barriers; (3) action self-efficacy, outcome expectancy, and risk perception; (4) intention; and (5) maintenance self-efficacy, recovery self-efficacy, and action and coping planning. The correlation matrix and the means and standard deviations for all variables are presented in Table 4.1.

The correlations among the dependent variable and the predictor variables ranged from small to large. Pearson product-moment correlation coefficients in the 20s to 30s range were found predominantly among variables in the correlational matrix. Symptom severity was found to be inversely related to physical activity/exercise behavior, \( r = -0.29, p < .01 \), and positively related to perceived barriers, \( r = 0.51, p < .01 \). Spirituality was moderately related to risk perception, \( r = 0.36, p < .01 \); outcome expectations, \( r = 0.26, p < .01 \); and action self-efficacy, \( r = 0.21, p < .05 \). Perceived barriers was inversely related to action self-efficacy, \( r = -0.27, p < .01 \). Physical activity/exercise social support was strongly associated with action and coping
planning, $r = .36, p < .01$, and moderately associated with physical activity/exercise behavior, $r = .17, p < .05$. Intention was found to be related to action self-efficacy, $r = .20, p < .05$; outcome expectancy, $r = .23, p < .01$; risk perception, $r = .27, p < .01$; action and coping planning, $r = .23, p < .01$; and physical activity/exercise behavior, $r = .27, p < .01$. Action and coping planning was moderately associated with recovery self-efficacy, $r = .35, p < .01$; physical activity/exercise support, $r = .36, p < .01$; outcome expectancy, $r = .26, p < .01$; and physical activity/exercise behavior, $r = .52, p < .01$.

Hierarchical regression analysis was used to examine the relative contributions of the four sets of HAPA variables as predictors of physical activity/exercise behavior in African Americans with HIV/AIDS. The results of the analysis, including values of change in $R^2 (\Delta R^2)$, along with unstandardized regression coefficients ($B$), standard errors ($SE B$), and standardized coefficients ($\beta$) for the predictor variables at each step and in the final mode are presented in Table 4.2.

In the first step of the regression analysis, symptom severity was entered as a predictor variable. This predictor accounted for a significant amount of variance in physical activity/exercise behavior, $R = .29, R^2 = .08, F (1, 109) = 9.77, p < .01$. Examining the standardized partial regression coefficients, symptom severity was found to significantly contribute to the change in variance in physical activity/exercise behavior scores, with $\beta = -.29, t (109) = 3.13, p < 0.01$. This result indicates that symptom severity was inversely associated with physical activity/exercise behavior, and each standard deviation unit change on symptom severity was predicted to correspond to a $-0.29$ standard deviation unit change on physical activity/exercise behavior scores.
Contextual variables (i.e., spirituality, physical activity/exercise social support, and perceived barriers) were entered in the second step of the regression analysis. The addition of these variables did not account for a significant increase in variance of physical activity/exercise behavior beyond that explained by symptom severity, \(R = .34, R^2 = .11, \Delta R^2 = .03, F (3, 105) = 1.15, p = .33, n.s\). None of the contextual variables were found to be significant. However, after controlling for the effect of contextual variables, symptom severity was still found to significantly contribute to the change in variance in physical activity/exercise behavior, with \(\beta = -.28, t (109) = 2.60, p < .05\).

Social-cognitive health variables (i.e., action self-efficacy, outcome expectancy, and perceived risk) were entered in the third step of the regression analysis. This set of predictors also did not account for a significant amount of additional variance in physical activity/exercise behavior scores beyond that explained by symptom severity and contextual variables entered in the previous steps of the regression model, \(R = .41, R^2 = .17, \Delta R^2 = .06, F (3,102) = 2.31, p =.08, n.s\). However, outcome expectancy was found to contribute significantly to the change in variance in physical activity/exercise behavior scores, with \(\beta = .20, t (109) = 2.10, p < .05\), indicating that increased outcome expectancy was associated with higher levels of physical activity/exercise behavior. Action self-efficacy (\(\beta = .13, t (109) = 1.35, p = .18, n.s\)) and risk perception (\(\beta = .06, t (109) = .60, p = .55, n.s\)) were not found to be significant contributors to the change in variance in levels of physical activity/exercise behavior. Symptom severity remained a significant variable after controlling for the effect of symptom severity and contextual and social-cognitive health variables, with \(\beta = -.25, t (109) = 2.28, p < .05\).
Table 4.1
Correlations, Means, and Standard Deviations for Variables Used in Hierarchical Regression Analyses

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical activity/exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Symptom severity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.29**</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3. Spirituality</td>
<td>.07</td>
<td></td>
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<tr>
<td>4. Perceived barriers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.13</td>
<td>.51**</td>
<td>-.20*</td>
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<tr>
<td>5. Physical activity/exercise</td>
<td></td>
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*Note. \( F(11,98) = 4.70, p < .001 \) for the full model; \( F(1,109) = 9.77, p < .01 \), for Step 1; \( F(3,105) = 1.15, p = .33, \) n.s. for Step 2; \( F(3,102) = 2.31, p = .08, \) n.s. for Step 3; \( F(1,101) = 4.62, p < .05 \) for Step 4; \( F(3.98) = 6.99, p < .001 \) for Step 5. 
*\( p < .05 \), **\( p < .01 \)
Intention to engage in physical activity/exercise was entered in the fourth step of the regression analysis. Intention accounted for a significant amount of additional variance in physical activity/exercise behavior scores beyond that explained by the symptom severity, contextual, and social-cognitive health promotion variables entered in previous steps, $R = .45$, $R^2 = .21$, $\Delta R^2 = .04$, $F (1,101) = 4.62$, $p < .05$. Intention was found to contribute significantly to the change in variance in physical activity/exercise behavior scores, with $\beta = .21$, $t (109) = 2.15$, $p < .05$, indicating that increased intention to engage in physical activity/exercise was associated with higher levels of physical activity/exercise behavior. Symptom severity remained a significant contributor to the variance in physical activity/exercise behavior, $\beta = -.25$, $t (109) = 2.32$, $p < .05$. However, outcome expectancy became nonsignificant in this step, $\beta = .15$, $t (109) = 1.58$, $p = .12$, n.s., suggesting that its effect on physical activity/exercise behavior was mediated by the inclusion of the intention variable in the model.

In the final step, maintenance self-efficacy, recovery self-efficacy, and action and coping planning were entered into the regression analysis. The addition of this set of social-cognitive and theory of planned behavior variables accounted for a significant amount of additional variance in physical activity/exercise behavior scores beyond that explained by the predictor variables entered in previous steps, $R = .59$, $R^2 = .35$, $\Delta R^2 = .14$, $F (3.98) = 6.99$, $p < .001$. Action and coping planning was found to contribute significantly to the change in variance in physical activity/exercise behavior scores, with $\beta = .44$, $t (109) = 4.41$, $p < .001$, indicating that increased action and coping planning was associated with higher levels of physical activity/exercise behavior. Symptom severity remained a significant contributor to the variance in physical activity/exercise behavior, $\beta = -.22$, $t (109) = 2.12$, $p < .05$. 
The final regression model accounted for 35% ($f^2 = .53$) of the variance in physical activity/exercise behavior. According to Cohen’s standards for the behavioral sciences, this is considered a large effect size (Cohen, 1988; 1992). Controlling for all other factors, symptom severity and action and coping planning were found to be significant predictors of physical activity/exercise behavior in African Americans with HIV/AIDS. Symptom severity was negatively associated with physical activity/exercise behavior, while action and coping planning was positively related to physical activity/exercise behavior. In addition, outcome expectancy was a significant predictor of physical activity/exercise intention, and physical activity/exercise intention was a significant predictor of physical activity/exercise behavior before action and coping planning was included in the regression model.

**Mediation Analysis**

Finally, three mediation analyses were conducted to answer research questions 2, 3 and 4 and to further clarify the contribution of the theory of planned behavior and social-cognitive variables in the HAPA model. In the first analysis, action self-efficacy, outcome expectancy, and risk perception were hypothesized to be mediators between symptom severity and physical activity/exercise intention. In the second analysis, maintenance self-efficacy, recovery self-efficacy, and action and coping planning were hypothesized to be mediators between physical activity/exercise intention and physical activity/exercise behavior. In the third analysis, physical activity/exercise behavior was hypothesized to be a mediator between symptom severity and health-related quality of life. Baron and Kenny’s (1986) application of multiple regression was used to test these hypotheses, and the results of the mediation analyses are presented in Table 4.3. Guidelines provided by Frazier, Tix, and Baron (2004), Baron and Kenny (1986), and
Preacher and Hayes (2004) were followed in conducting the mediation analysis. The procedure involved a three-step approach:

1. Regress the mediator onto the independent variable (IV) to show that it is possible that the two variables can be causally linked.
2. Regress the dependent variable (DV) onto the IV to show that this causal relationship is also possible.
3. Regress the DV simultaneously onto the IV and the mediator to show that the mediator is significantly related to the DV, even when the IV is statistically controlled.

A mediator hypothesis is supported if the regression coefficients for steps 1 and 2 are significant and if the partial regression coefficient for predicting the DV from the mediator is significant in the third step (Baron & Kenny, 1986). In this study, a mediational hypothesis of the relationship between symptom severity and physical activity/exercise intention, and the relationship between physical activity/exercise intention and physical activity/exercise behavior were tested.

For research question 2, based on the HAPA model, it was hypothesized that the association between symptom severity and physical activity/exercise intention is mediated by action self-efficacy, outcome expectancy, and risk perception. Contrary to expectations, the association between symptom severity (IV) and physical activity/exercise intention (DV) (step 2) was not significant: $\beta$ (95% confidence interval [CI]) = $-0.06$ ($-0.25$, $-0.14$). (Note: If the 95% CI excludes 0, the effect size differs significantly from 0, $p < .05$.) Therefore, a mediator analysis was not conducted and the mediator hypothesis for research question 2 cannot be supported.

For the second mediator analysis (research question 3), a mediational hypothesis of the relationship between physical activity/exercise intention and physical activity/exercise behavior
was tested. As expected, physical activity/exercise intention (IV) and physical activity/exercise behavior (DV) (step 2) was significant: $\beta$ (95% CI) = .27 (.09, .46). Subsequently, the association between the IV (symptom severity) and each of the mediators (step 1) was assessed. Physical activity/exercise intention was significantly related to action and coping planning, $\beta$ (95% CI) = .23 (.04, .41) but not associated with maintenance self-efficacy or recovery self-efficacy. Finally, while statistically controlling for the IV (step 3), one of the three potential mediators, action and coping planning, was found to be significantly associated with the DV (physical activity/exercise behavior), $\beta$ (95% CI) = .48 (.31, .66). The relevant analysis was a simultaneous regression of physical activity/exercise behavior (DV) onto physical activity/exercise intention (IV), maintenance self-efficacy, recovery self-efficacy, and action and coping planning. The model accounted for 29% of the variance in physical activity/exercise intention, $R = .54$, $R^2 = .29$, $f^2 = .41$, $F (4, 105) = 10.92, p < .001$, which is considered a large effect size (Cohen, 1988; 1992). All three steps were significant as predicted, yielding support for the proposed mediation model. Nonetheless, these findings only support a single mediator model rather than a tri-mediation model.

To formally test the mediational effect of action and coping planning, both the Sobel test and the bootstrap procedure recommended by Preacher and Hayes (2004) were computed. The Sobel test ($z = 2.19, p < .05$) indicated that association between physical activity/exercise intention and physical activity/exercise behavior was significantly reduced (from $\beta = .27$ to .17) by the inclusion of the mediator variable (action and coping planning) in the model. The bootstrapped estimate of the indirect effect, with 3,000 resamples, is similar to the point estimate computed from the conventional regression analysis of the raw data, and the true indirect effect is estimated to lie between 0.02 and 0.22 with 95% CI. Because zero is not in the 95% CI, it can
be concluded that the indirect effect is significantly different from zero, \( p < .05 \) (two-tailed). The results of this mediator analysis indicate that action and coping planning partially mediated the association between intention and behavior. The results of the mediator analysis are summarized in Table 4.3.

For the third mediator analysis (research question 4), a mediational hypothesis of the relationship between symptom severity and health-related quality of life was tested. As expected, symptom severity (IV) and the physical health component of the Short-Form 12 (DV) (step 2) was significant: \( \beta \) (95% CI) = \(-.41\) (\(-.57, -.22\)). Subsequently, the association between the IV, symptom severity, and the mediator, physical activity/exercise behavior (step 1), was assessed. Symptom severity was significantly related to physical activity/exercise behavior, \( \beta \) (95% CI) = \(-.29\) (\(-.47, -.11\)). Finally, while statistically controlling for the IV (step 3), physical activity/exercise behavior (the mediator) was not associated with the DV (physical health), \( \beta \) (95% CI) = .14 (\(-.06, .33\)). Physical activity/exercise behavior cannot significantly reduce the \( \beta \) for symptom severity (reduced from \(-.41\) to \(-.36\)). Although physical activity/exercise behavior is significantly related to physical health (\( r = .26, p < .01 \)), it is not strong enough to mediate the effect of symptom severity on physical health.

The same analysis was repeated for the mental health component of the health-related quality of life measure. Symptom severity was significantly associated with mental health, \( \beta \) (95% CI) = \(-.56\) (\(-.71, -.39\)). Symptom severity was significantly related to physical activity/exercise behavior, \( \beta \) (95% CI) = \(-.29\) (\(-.47, -.11\)). Finally, while statistically controlling for the IV (step 3), physical activity/exercise behavior (the mediator) was not associated with the DV (mental health), \( \beta \) (95% CI) = .10 (\(-.08, .28\)). Physical activity/exercise behavior cannot significantly reduce the \( \beta \) for symptom severity (reduced from \(-.56\) to \(-.52\)). Although physical
activity/exercise behavior is significantly related to mental health ($r = .27, p < .01$), it is not strong enough to mediate the effect of symptom severity on mental health. The hypothesis that physical activity/exercise behavior can mediate the relationship between symptom severity and health-related quality of life was not supported.
Table 4.3

Steps in Testing Action and Coping Planning as a Mediator between Physical Activity/Exercise Intention and Physical Activity/Exercise Behavior

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Regression 2 (Path b and c): Physical activity/exercise intention predicting physical activity/exercise behavior controlling for action and coping planning

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Note. CI = confidence interval.
* $p < .05$, ** $p < .01$. 
Additional Analysis

Two simultaneous regression analyses were computed to further clarify the contribution of the theory of planned behavior and social-cognitive health promotion variables as predictors of physical activity/exercise intention in the motivational phase and physical activity/exercise behavior in the volition phase of the HAPA model.

First, physical activity/exercise intention was regressed simultaneously onto action self-efficacy, outcome expectancy, and risk perception. Only two of the three social cognitive predictors, outcome expectancy and risk perception, were found to be significantly associated with physical activity/exercise intention (DV), $\beta$ (95% CI) = .20 (.01, .38) and .24 (.06, .42), respectively. Surprisingly, action self-efficacy was not predictive of physical activity/exercise intention as posited by the HAPA model. Simultaneous regression results support the importance of outcome expectancy and risk perception as motivational variables for predicting physical activity/exercise intention in the HAPA model. Figure 4.1 presents a graphical representation of the structural relationships among constructs in the motivational phase of the HAPA model.

Second, physical activity/exercise behavior was regressed simultaneously onto maintenance self-efficacy, recovery self-efficacy, and action and coping planning. Only action and coping planning was found to be significantly associated with physical activity/exercise behavior (DV), $\beta$ (95% CI) = .51 (.34, .69). Again, physical activity/exercise self-efficacy was not found to be a significant predictor in the volitional stage of the HAPA model. Figure 4.2 presents a graphical representation of the structural relationships among constructs in the volitional phase of the HAPA model.
Figure 4.1. Health Action Process Approach (HAPA): Physical Activity/Exercise Intention in African Americans with HIV/AIDS
Figure 4.2: Health Action Process Approach (HAPA): Physical Activity/Exercise in African Americans with HIV/AIDS
CHAPTER FIVE

Summary, Discussion, and Implications

There is good evidence that physical activity/exercise is associated with increased immune functioning for persons with HIV/AIDS. However, health promotion interventions for African Americans with HIV/AIDS must encourage self-initiated health behaviors (e.g., physical activity/exercise) and emphasize the need to enhance personal responsibility and commitment to a healthy lifestyle. Therefore, how well African Americans with HIV/AIDS manage their physical health depends more on what they do themselves than on what is done to them. Learning and practicing adaptive physical activity/exercise self-management techniques can be challenging, however, and behavior changes necessary for physical activity/exercise self-management are unlikely to occur in the absence of significant motivation. With varying degrees of success, rehabilitation health professionals including counselors and psychologists have been exploring the use of motivation-focused interventions to help individuals with chronic illness and disability (CID) engage in health promotion behaviors. Clearly, more theory-driven research is needed to better understand motivation, coping, and physical activity/exercise self-management and to guide the development and validation of evidence-based physical activity interventions for people with HIV/AIDS. This study addressed the need for culturally sensitive, evidence-based practice for diverse groups by focusing specifically on health promotion for African Americans with HIV/AIDS, because they are disproportionately impacted by their health condition. This study evaluated the Health Action Process Approach (HAPA) as a motivational model for physical activity/exercise self-management for African Americans with HIV/AIDS.
Summary of Findings

An examination of the Pearson product-moment correlation coefficients (Pearson $r$) among the predictor variables themselves and between the predictors and the outcome variable ranged from small to large.

- Symptom severity was negatively related to physical activity/exercise participation ($r = -.29$, a medium effect size), action self-efficacy ($r = -.21$, between a small and a medium effect), outcome expectancy ($r = -.18$, between a small and a medium effect), recovery self-efficacy ($r = -.23$, between a small and a medium effect), and action and coping planning ($r = -.18$, between a small and a medium effect); it was strongly associated with perceived barriers to physical activity/exercise ($r = .51$, a large effect size). Symptom severity had a significant effect on perceived barriers to physical activity/exercise and actual physical activity/exercise behavior. It also affected physical activity/exercise self-efficacy, outcome expectancy, and action and coping planning.

- Spirituality was not related to physical activity/exercise participation ($r = .07$), but it was positively related to action self-efficacy ($r = .21$, between a small and a medium effect), outcome expectancy ($r = .26$, close to a medium effect size), and risk perception ($r = .36$, a medium effect size). Spirituality was also negatively associated with perceived barriers ($r = -.20$, between a small and a medium effect). Spirituality had a moderate effect on reducing the perception of barriers to physical activity/exercise and it also had a positive effect on motivation toward physical activity/exercise.

- Perceived barriers was negatively related to action self-efficacy ($r = -.27$, close to a medium effect size), outcome expectancy ($r = -.17$, between a small and a medium effect), and
recovery self-efficacy ($r = -.20$, between a small and a medium effect). Perceived barriers had a moderate effect on motivational factors toward physical activity/exercise behavior.

- Physical activity/exercise social support was significantly related to action and coping planning ($r = .36$, a medium effect size).

- Action self-efficacy was associated with physical activity/exercise intention ($r = .20$, between a small and a medium effect) and action and coping planning ($r = .20$, between a small and a medium effect).

- Outcome expectancy was associated with physical activity/exercise intention ($r = .23$, between a small and a medium effect) and action and coping planning ($r = .26$, close to a medium effect size).

- Risk perception was associated with physical activity/exercise intention ($r = .27$, close to a medium effect size) and recovery self-efficacy ($r = .18$, between a small and a medium effect).

- Physical activity/exercise intention was associated with recovery self-efficacy ($r = .18$, between a small and a medium effect) and action and coping planning ($r = .23$, between a small and a medium effect).

- Maintenance self-efficacy was associated with recovery self-efficacy ($r = .24$, between a small and a medium effect).

- Recovery self-efficacy was associated with action and coping planning ($r = .35$, a medium effect size).

- Action and coping planning was strongly related to physical activity/exercise participation ($r = .52$, a large effect size) and to physical activity/exercise social support ($r = .36$, a medium effect size).
effect size). It had a moderate relationship with symptom severity ($r = -.18$, between a small and a medium effect).

- Physical activity/exercise participation was strongly associated with action and coping planning. In addition, it was moderately associated with physical activity/exercise social support ($r = .17$, between a small and a medium effect), action self-efficacy ($r = .20$, between a small and a medium effect), outcome expectancy ($r = .25$, between a small and a medium effect), and physical activity/exercise intention ($r = .27$, close to a medium effect size), and it was negatively associated with symptom severity ($r = -.29$, a medium effect size).

For the primary hierarchical regression analysis, symptom severity accounted for 29% of the variance in physical activity/exercise behavior in step 1. Adding the contextual variables (i.e., spirituality, perceived barriers, and physical activity/exercise social support) to the model did not significantly increase the $R^2$ ($\Delta R^2 = 3\%$); none of the contextual variables were significant after controlling for the effect of symptom severity. In the third step, the social-cognitive variables (i.e., action self-efficacy, outcome expectancy, and risk perception) were entered. Only outcome expectancy contributed to a significant change in variance in physical activity/exercise scores after controlling for the effect of other variables in the regression model. Physical activity/exercise intention was entered as the fourth step, and this variable contributed to a significant amount of variance in physical activity/exercise scores beyond what was contributed by symptom severity, contextual factors, and the social-cognitive variables ($\Delta R^2 = 4\%$). However, with the addition of intention to engage in physical activity/exercise to the model, outcome expectancy became nonsignificant in this step. Action and coping planning and
maintenance and recovery self-efficacy variables were entered in the final step of the analysis. The addition of the fifth and final set of variables contributed to a significant change in variance in physical activity/exercise scores beyond the previous predictor sets entered ($\Delta R^2 = 14\%$). In this final step, action and coping planning emerged as a significant contributor to physical activity/exercise behavior scores. In all steps of the analyses, symptom severity remained a significant contributor to the variance in physical activity/exercise behavior scores. The final model contributed to 35\% of the variance in physical activity/exercise behavior scores for African Americans with HIV/AIDS, which is considered a large effect size and provides good support for the use of the HAPA model as a motivational model for physical activity/exercise self-management for African Americans with HIV/AIDS.

Secondary analyses were conducted to clarify the contribution of the theory of planned behavior variables (i.e., intention and action and coping planning) and social-cognitive variables (i.e., action self-efficacy, outcome expectancy, and risk perception) in the HAPA model. First, results showed that the relationship between symptom severity and physical activity/exercise intention was not significant; therefore, action self-efficacy, outcome expectancy, and risk perception could not act as mediators on the relationship between symptom severity and physical activity/exercise intention. The relationship between physical activity/exercise intention and physical activity/exercise participation was significant, and it was found that action and coping planning partially mediated the relationship between physical activity/exercise intention and physical activity/exercise participation. However, maintenance self-efficacy and recovery self-efficacy were not significant mediators for the intention-action relationship. In addition, the relationship between symptom severity and the physical and mental health components of health-related quality of life were not mediated by physical activity/exercise behavior as hypothesized.
Physical activity/exercise behavior was also tested as a mediator between symptom severity and health-related quality of life. Although physical activity/exercise behavior was significantly associated with health-related quality of life, the effect of physical activity/exercise was not strong enough to mediate the negative relationship between symptom severity and health-related quality of life. Finally, the contribution of social-cognitive variables to physical activity/exercise intention was examined using simultaneous regression analysis. The results indicated that outcome expectancy and risk perception (but not action self-efficacy) significantly predicted physical activity/exercise intention. Similarly, physical activity/exercise behavior was regressed simultaneously onto maintenance self-efficacy, recovery self-efficacy, and action and coping planning. Only action and coping planning was found to be significantly associated with physical activity/exercise behavior.

**Discussion**

This study evaluated the HAPA model as a motivational model for physical activity/exercise self-management for African Americans with HIV/AIDS. To begin with, the primary analysis evaluated whether the HAPA constructs in the expanded model (i.e., symptom severity, contextual variables, social-cognitive health variables, and theory of planned behavior variables) predicted physical activity/exercise behavior in African Americans with HIV/AIDS. The model accounted for 35% of the variance in physical activity/exercise participation for this population. Thus, the results of this study provide some support for the use of the HAPA model in the design and implementation of physical activity/exercise behavioral interventions for African Americans with HIV/AIDS. Symptom severity and action and coping planning emerged as significant predictors in physical activity/exercise behavior. Additionally, outcome expectancy emerged as a significant predictor of intention. Intention predicted physical activity/exercise
behavior prior to the addition of action and coping planning to the regression model. Physical activity/exercise social support was also found to be significantly and moderately associated with action and coping planning.

Persons with HIV/AIDS experience a wide range of symptoms within the physiological and psychological realms. These symptoms may create barriers to physical activity/exercise and influence the motivation of people with HIV/AIDS to engage in health-promoting behaviors—such as exercise, healthy eating, and weight management—to improve their health status and quality of life. Research shows that symptom severity is associated with engaging in health-promoting behaviors for persons with HIV/AIDS (Siegel, Schrimshaw, & Dean, 1999). Keegan, Chan, Ditchman, and Chiu (2012) recently conducted a study to validate Pender’s Health Promotion Model for physical activity/exercise in people with spinal cord injuries; they also reported a similar negative relationship between the severity of the spinal cord injuries and physical activity/exercise participation ($r = -0.33$). Chiu, Lynch, Chan, and Berven (2011) evaluated HAPA as an exercise model for people with multiple sclerosis; they found that symptom severity had an indirect effect on exercise behavior through the effect of perceived barriers. In this study, symptom severity was found to be negatively associated with the mental health and physical health components of the SF-12, which is consistent with the results of the original study validating the HIV Symptom Index (Justice et al., 2001).

With the advent of ART/HAART medication regimens, many persons with HIV/AIDS have higher CD4 counts and lower viral loads. Based on these biomarkers, the classifications of “HIV symptomatic” and “HIV asymptomatic” emerged. Even though a person’s biomarkers may indicate an HIV asymptomatic status, it does not mean that the person is not experiencing symptoms (Willard et al., 2009). In this study, a majority of participants self-identified as HIV
asymptomatic in the demographic portion of the survey. However, in response to the HIV Symptom Index (Justice et al., 2001), participants reported experiencing symptoms, and based on these responses, symptom severity emerged as a significant predictor of physical activity/exercise behavior. It may be necessary to thoroughly assess a person’s subjective experience of symptoms above and beyond laboratory biomarkers and the labels of HIV symptomatic and asymptomatic prior to beginning any health promotion intervention. The inclusion of a functional disability measure may further elucidate the specific effect of symptom severity on physical activity/exercise participation among African Americans living with HIV/AIDS. Addressing symptoms prior to the start of a health promotion intervention may be necessary for this population and will lead to better outcomes.

As postulated in the HAPA model, action and coping planning emerged as a significant variable that bridged the gap between physical activity/exercise intention and physical activity/exercise behavior for African Americans with HIV/AIDS. This study provides further support for planning as a mediating variable between intention and behavior. Previous studies have evaluated the impact of action and coping planning in physical activity/exercise for clinical populations (Chiu, Lynch, Chan, & Berven, 2011; Sniehotta, Scholz, & Schwarzer, 2005), including cardiac rehabilitation populations (Sniehotta et al., 2005) and persons with multiple sclerosis (Chiu et al., 2011). Because intention for health behavior change is rarely successful on its own (Sutton, 2004), it is necessary to explain the gap between intention to engage in health-promoting behaviors and actual engagement in the behavior (Orbell & Sheeran, 1998; Sniehotta et al., 2005). Self-regulation assists in the transition from intention to action; and action and coping planning is a strategy for self-regulation (Sniehotta et al., 2005). Self-regulation via action and coping planning is relevant for African Americans with HIV/AIDS because there is
abundant literature on the barriers to health care and engaging in health-promoting behaviors for minority populations and for persons with CID. Planning allows a person to anticipate and counteract anticipated barriers for the best possible outcomes.

Of the social-cognitive health variables postulated in the HAPA model, outcome expectancy emerged as the most significant predictor of physical activity/exercise participation among African Americans with HIV/AIDS, prior to the entry of action and coping planning to the regression model. Chiu et al. (2011) also examined the effect of outcome expectancy in their evaluation of HAPA as a physical activity/exercise model for people with multiple sclerosis. In their model, action self-efficacy and risk perception also did not predict physical activity/exercise intention. They also found that outcome expectancy was the only social-cognitive predictor of physical activity/exercise intention and that the effect of physical activity/exercise intention on physical activity/exercise behavior is through the effect of action and coping planning. The finding that outcome expectancy has an important effect on physical activity/exercise intention and physical activity/exercise behavior is consistent with the research of Chlebowy and Garvin (2006), which examined social support, self-efficacy, and outcome expectations in African Americans with Type 2 diabetes. Their results showed that self-care behaviors were positively associated with outcome expectancy for African Americans, but there were no significant relationships between the constructs of self-efficacy and social support for this group. For African Americans, outcome expectancy may be more influential in increasing motivation for health behavior change than the other social-cognitive health variables postulated in the HAPA model (e.g., action self-efficacy).

Self-efficacy (i.e., action, maintenance, and recovery) did not emerge as significant predictors of physical activity/exercise intention as well as physical activity/exercise behavior.
These results may be due to several factors. The initial correlational analysis showed a small to medium relationship between action self-efficacy and physical activity/exercise ($r = .20$, $p < .05$) and between recovery self-efficacy and physical activity/exercise ($r = .20$, $p < .01$). However, in each step of the regression analysis, symptom severity remained the most significant predictor of physical activity/exercise behavior, suggesting that the effect of self-efficacy is not strong enough to mediate the negative effect of symptom severity on physical activity/exercise behavior. When symptom severity was not included in the secondary analysis, self-efficacy was still not predictive of physical activity/exercise intention when outcome expectancy was included as a predictor. Interestingly, Keegan et al. (2011), in their study of people with spinal cord injuries, also found that perceived benefits was a stronger predictor than self-efficacy for predicting commitment to an action plan of physical activity/exercise. According to the self-efficacy theory, self-efficacy causally influences expected outcomes of behavior, but not vice versa. However, the disproportionate focus on self-efficacy as a causal determinant of behavior at the expense of expected outcomes has been controversial; research has shown that expected outcomes could influence self-efficacy judgments (Williams, 2010). For African Americans living with HIV/AIDS, outcome expectancy appears to be a stronger motivational factor for physical activity/exercise intention and physical activity/exercise action than self-efficacy beliefs.

Spirituality was included as an additional predictor variable to expand the HAPA model because family and church are considered the two most important social institutions in African American communities (Chatters, Taylor, Lincoln, & Schroepfer, 2002). It has also been found that the church is often used as a venue for the delivery of health promotion interventions (e.g., Resnicow et al., 2005). However, spirituality was not a significant predictor of physical
activity/exercise behavior in this study. This finding is consistent with a recent study by Debnam et al. (2012) that hypothesized spiritual beliefs would be associated with health behaviors, including fruit and vegetable consumption, physical activity, and alcohol consumption among African Americans. However, their results also showed that spiritual beliefs were not associated with physical activity, only with fruit and vegetable consumption and alcohol consumption. Thus, spirituality may have a differential effect on certain health behaviors. For physical activity/exercise, spirituality may not act as a separate predictor but spirituality and religiosity may be relevant factors in the design and implementation of interventions geared toward physical activity/exercise. In this study, spirituality was associated with lower levels of perceived barriers to physical activity/exercise and higher levels of action self-efficacy, outcome expectancy, and risk perception. Several studies reveal increases in physical activity/exercise behavior in African Americans by targeting the church as the location for recruitment and/or actual intervention (e.g., Young & Stewart, 2006). In this sense, spirituality and religiosity may act as a proxy for social support (McCullough, Hoyt, Larson, Koenig, & Thoresen, 2000). As such, spirituality should not be ignored as a predictor in health behavior change; it just may be more relevant for other health behaviors, such as safer sex practice and alcohol or drug cessation as demonstrated by Young and Stewart. For physical activity/exercise participation, spirituality may be more relevant as a source of social support. Family as well as community-based social support have been identified as factors for increasing physical activity/exercise in African Americans (Duyn et al., 2007).

Finally, physical activity/exercise social support was not found to be a predictor of physical activity/exercise participation. However, it was significant and moderately related to action and coping planning. Social support has been identified as a strong determinant of health-
related quality of life in people with HIV/AIDS because it can reduce stress and depression and increase social participation (Bing et al., 2000). Physical activity/exercise social support from family and friends may provide the needed encouragement to eat healthier and engage in more physical activity/exercise, and it might help individuals with HIV/AIDS to develop action and coping planning strategies that will allow them to continue to be active even when they encounter difficulties and setbacks because of symptoms. As mentioned, self-regulation is important to health-promoting behaviors; physical activity/exercise social support contributes to action and coping planning; and action and coping planning helps to heighten self-regulation and leads to higher levels of physical activity/exercise participation. Social support is an important aspect of African American life and culture and contributes significantly to the resiliency of African Americans (Brown, 2008). Therefore, rehabilitation health professionals should consider physical activity/exercise social support to be an important cultural factor when developing health promotion behavioral intervention for African Americans with HIV/AIDS despite the non-significant relationship between social support and physical activity/exercise participation in this study.

**Implications for Clinical Practice**

Health promotion interventions should be geared toward persons with CID because this population, especially the African American population, is at a greater risk for preventable health complications (e.g., obesity-related illnesses). African Americans are disproportionately impacted by several health conditions, including HIV/AIDS. Engaging in health-promoting behaviors, including physical activity/exercise, has been proven to extend longevity and quality of life in persons with CID and to improve immune functioning in persons with HIV/AIDS. Health promotion interventions to increase health-promoting behaviors should be based on
empirically supported models, such as the HAPA model. Results of this study provide partial support for the use of the HAPA model as a framework for the design and implementation of health promotion behavioral interventions targeting physical activity/exercise for African Americans with HIV/AIDS.

There are a few important considerations in the design of interventions based on this model. First, symptom assessment and symptom management is necessary prior to the start of a health promotion intervention. Symptom severity emerged as a significant predictor of physical activity/exercise in each step of the regression analysis. If individuals with HIV/AIDS are experiencing more symptoms, they may be less likely to engage in physical activity/exercise. Addressing symptoms first may lead to better outcomes in physical activity/exercise behavior. Second, outcome expectancy emerged as the most significant predictor of intention, more so than action self-efficacy or risk perception. Thus, any health promotion intervention intended to increase motivation for health behavior change in African American with HIV/AIDS should focus on positive outcome expectancy (e.g., If I exercise three times a week, I’ll have more endurance for my daily activities). Third, action and coping planning should be addressed in interventions that target physical activity/exercise behavior for African American with HIV/AIDS because action and coping planning mediates the relationship between intention and action. Interventions aimed toward action planning should address when, where, how, how often, and with whom the physical activity/exercise behavior will take place. Action and coping planning interventions should focus on barriers to engaging in physical activity/exercise (e.g., lack of access to exercise facilities in the community, transportation difficulties, lack of support). Developing useful, individualized strategies addresses the intention behavior gap and may lead
to better outcomes for African Americans with HIV/AIDS, as shown in HAPA-based interventions for other populations (e.g., cardiac rehabilitation).

**Implications for Research**

This study supports the use of Schwarzer’s HAPA framework as a physical activity/exercise model for African Americans with HIV/AIDS. In future studies, this model should be evaluated for other health-promoting behaviors in African Americans with HIV/AIDS, such as healthy diet, smoking cessation, and safe-sex behaviors. Additionally, this model should be tested with other chronic health conditions within the African American population, such as hypertension, diabetes, and substance abuse.

Future research should include a qualitative component prior to expanding and refining the model to make it more culturally relevant for African Americans. This study examined spirituality as a contextual factor based on a review of the literature. However, it may be more relevant to conduct focus groups among African Americans with HIV/AIDS to determine what personal, environmental, and sociocultural factors are relevant in helping African Americans to engage in health-promoting behaviors. This consumer-driven approach may be more useful in adapting current empirically supported models for diverse groups.

In considering spirituality for health behavior change research in African Americans, future research should examine specifically to what extent spiritually will be a good predictor for what kinds of health-promoting behaviors. Also, future studies should aim to determine whether certain aspects of spirituality, such as coping or social support, contribute more to health-promoting behaviors.

Future research should evaluate the predictive ability of social ecological models of health promotion for African Americans. Fleury and Lee (2006) suggest that social ecological
models may be more relevant in guiding interventions for physical activity/exercise behavior in African Americans, especially for women. Social ecological models address personal factors and environmental factors that contribute to health behavior change. One social ecological model gaining attention in the health and rehabilitation literature is the International Classification of Functioning, Disability and Health, or the ICF model (WHO, 2001). This model specifically addresses the interaction between personal and environmental factors and may be a useful framework in the future development of culturally sensitive health promotion models and interventions for diverse populations.

There are 2 other models gaining attention in the health and rehabilitation literature that may provide further insight in the health behavior change process for persons with CID, including African Americans with HIV/AIDS. The first model, self-determination theory (Ryan, Patrick, Deci & Williams, 2008) addresses the process in which in a person develops the motivation for health behavior change. One construct of the model, autonomy addresses whether internal (e.g., valuing healthy lifestyle habits such as physical activity/exercise) or external (e.g., engaging in health promoting behaviors to gain incentives or avoid punishments) factors predict motivation for health behavior change. The second model entitled the extended parallel process model (Witte, 1992) addresses health communication and incorporates aspects of protection motivation theory (described in Chapter 2). The extended parallel process model postulates (a) perceived susceptibility or threat predicts an individual’s reaction to messages geared toward health behavior change (e.g., commercials to increase condom usage in persons with HIV/AIDS) and (b) perceived efficacy predicts an individual’s response to those messages. This model may be useful in addressing the ways rehabilitation health care professionals and key stakeholders communicate to persons with CID regarding health behavior change. Considering these
additional models may provide greater insight to factors that motivate persons with CID to engage in health promoting behaviors in order to develop evidence-based interventions targeted and tailored towards health behavior change.

**Limitations**

Any interpretation of the results of this study should consider the following limitations. First, due to the study’s recruitment method, a convenience sample was used in that the participants were consumers of several case management agencies providing services to African Americans with HIV/AIDS in the Baton Rouge area only. The use of a convenience sample may limit the generalizability of the results. Because there is an income requirement to receive case management services, only those persons with lower income received services from these agencies. Therefore, the sample may have an overrepresentation of persons from lower socioeconomic status. Future studies should expand participant recruitment to hospitals, clinics, and other community-based organizations that provide services to African Americans with HIV/AIDS on a larger scale.

Second, the study may not have accurately measured some constructs. In measuring action self-efficacy, for example, the instrument included only 2 items. Thus, it may not have appropriately tapped into the construct. Third, self-report survey methodology has several limitations. Data for the physical activity/exercise outcome variable were collected using a self-report format and may not be similar to data collected by more objective measurement techniques (e.g., measuring actual activities using pedometers). In addition, self-report measures of physical activity/exercise may be heavily influenced by retrospective recall errors and state-dependent biases.
To address the second and third limitations in future studies, researchers should consider using ecological momentary assessment (EMA). EMA is a novel measurement approach that uses mobile devices to allow near real-time tracking of indices of behavior, cognition, and emotion in the daily lives of the participants. It allows the simultaneous assessment of psychological and behavioral variables and events as they naturally occur in real time. EMA combines the ecological validity of naturalistic behavioral observation with the nonintrusive nature of diaries and the precision of scaled questionnaire measures. Sampling an experience/event the moment it occurs avoids the potential distortions associated with the use of retrospective diaries or survey measures (Shiffman, Stone, & Hufford, 2008).

EMA has the advantage of being an ecological process that can be used to study “natural behavioral patterns” of research participants influenced by many environmental and interpersonal factors that typify daily living (Wilhelm & Roth, 1998). EMA research can sample characteristics of the environment (e.g., time, location, social companion, etc.) that change over time. Importantly, EMA data collections can be tailored to reveal relevant social and physical contexts for health behaviors and potential barriers (Shiffman et al., 2008; Smyth & Stone, 2003; Wilhelm & Roth, 1998). Therefore, in the future, researchers assessing health-promoting behaviors in African Americans with HIV/AIDS may want to consider the use of EMA to validate health promotion models as well as validate outcome measures for experimental studies that examine the effectiveness of health promotion behavioral interventions.

Fourth, the sample size of this study is relatively small. Typically, researchers recommend a 10:1 ratio of participants and predictor variables (Wampold & Freund, 1987) for testing whether the overall $R^2$ deviates from zero. With 11 predictors, the sample size of 110 for this study is appropriate for testing the overall $R^2$; however, a larger sample size may be required
to test an increased $R^2$ in hierarchical regression analysis. An underpowered study may find no significant difference for some predictors even in the presence of a real difference in the population.

**Conclusion**

The findings of this study support the use of Schwarzer’s HAPA model in predicting physical activity/exercise behavior for African Americans with HIV/AIDS. The model accounts for 35% of the variance in physical activity/exercise behavior scores. The most significant predictor variables were symptom severity, outcome expectancy, and action and coping planning. Action and coping planning partially mediated the relationship between physical activity/exercise intention and behavior. Other variables in the HAPA model, such as action self-efficacy, recovery self-efficacy, and social support were found to correlate with physical activity/exercise behavior scores, but their effects were mediated by other predictor variables in the model, mainly symptom severity, intention, and action and coping planning. The results of this study provide partial support for the validation of this model for predicting physical activity/exercise participation in African Americans with HIV/AIDS. However, future research to better understand cultural variables influencing health-promoting behaviors of African Americans with HIV/AIDS is warranted.
References


Appendix A

IRB Exemption

<table>
<thead>
<tr>
<th>University of Wisconsin-Madison</th>
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</thead>
<tbody>
<tr>
<td><strong>IRB Review Determination for Exemption or Not Human Subjects Research</strong></td>
</tr>
<tr>
<td>Health Sciences IRB • Health Sciences Minimal Risk IRB</td>
</tr>
</tbody>
</table>

Project/Protocol Number: 2012-0559
Project Lead/Principal Investigator: Ruth Lynch
Project/Protocol Title: Applying the Health Action Process Approach Model to Predict Physical Activity and Health-related Quality of Life in African Americans Living with HIV/AIDS: A Path Analysis
Staff Reviewer & Contact Information: Chelsea Dahmen, BS; 265-4389; cmdahmen@medicine.wisc.edu
Date Exemption Granted: September 13, 2012

The IRB has reviewed the study indicated above for exemption and its determination is indicated below. Please review this determination and any additional guidance provided by the IRB. If you have any questions regarding this determination, please contact the staff reviewer listed above. For additional details regarding the submitted exemption application, you must log in to your ARROW account at www.arrow.wisc.edu.

- [ ] IRB review is not required because, in accordance with federal regulations, your project does not
  - [ ] constitute research as defined under 45 CFR 46.102(d)
  - [ ] involve human subjects as defined under 45 CFR 46.102(f)

Additional Information:

- [ ] Your study qualifies for exemption under category 45 CFR 46.101(b)(2). Although your study is exempt from federal regulations, UW Human Research Protection Program policy requires that all human subjects research be conducted in accordance with the highest ethical standards/Beinert Report. Please contact the staff reviewer listed above if you plan to make a significant change to your research that affects the exempt status of your study (see examples below).

  Additional Information:

- [ ] Although your study qualifies for exemption under category ______________, it also requires review by the MR-IRB for the reasons outlined below.

  Additional Information:

- [ ] Your study involves the use and/or disclosure of PHI and therefore, HIPAA regulations apply. The following are approved by the IRB:
  - [ ] HIPAA Authorization Form
  - [ ] Application for Waiver of Authorization
  - [ ] Other:

  Additional Information:

Examples of changes that could affect the exempt status of a study
45 CFR 46.101(b)(1): Changes to the setting in which the educational activity is being conducted could affect the exempt status. In addition, changes to the purpose for which an educational activity is being conducted (e.g., conducting an activity specifically for research purposes rather than a standard class requirement) could also affect the exempt status under category 1.

45 CFR 46.101(b)(2): Changes to the identifiability of survey or interview results could affect the exempt status under category 2, as well as changes to the survey or interview tools to add collection of sensitive or stigmatizing information.

45 CFR 46.101(b)(4): Changes to the data range for data collection such that not all of the data is currently in existence could affect the exempt status under category 4, as well as changes to the identifiability of the data to be collected.
Appendix B

Survey Flyer

Health Promotion Survey

Interested in helping study how your health behavior can influence how you live with HIV/AIDS?

We are seeking:

(1) African Americans diagnosed with HIV or AIDS

(2) Age 18 or older

You can participate in the study by coming to the conference room.

The survey will take you approximately 30-45 minutes to complete. After completing the survey, you will be rewarded with $20 gift card for your time and effort.

We appreciate your support. Your participation will contribute to health promotion knowledge and practice for African Americans living with HIV/AIDS.

If you have any questions about the study, please do not hesitate to contact me.

Thank you in advance.

Contact Information

Eboney Johnson
Ph.D. Candidate
University of Wisconsin-Madison
Department of Rehabilitation Psychology & Special Education
1000 Bascom Hall 4th Floor
Madison, WI 53706
Phone: (608) 381-5878
Email: ejohnson6@wisc.edu
Appendix C

Study Information Sheet

Title of Study: Applying the Health Action Process Approach Model to Predict Physical Activity and Health-related Quality of Life in African Americans living with HIV/AIDS: A Path Analysis

Principal Investigator: Ruth Lynch, Ph.D. (phone:(608)-263-7785, email: rlynch@education.wisc.edu)
Co Principal Investigator: Ebonee Johnson, M.S. (phone:(608)-381-5878, email: etjohnson6@wisc.edu)

Description of the Research: You are invited to participate in a research study about physical activity and health-related quality of life for African Americans with HIV/AIDS. You are able to participate if you are 18 years of age or older and have a diagnosis of HIV or AIDS. The purpose of this research is to learn more about what does or does not motivate African Americans with HIV/AIDS to engage in physical activity. This study will only include African Americans with a diagnosis of HIV or AIDS.

What will my participation involve?: If you decide to participate in this research, you will be asked to complete this survey. Your participation will last approximately 30-45 minutes.

Are there any risks to me?: Your participation in this study is of minimal risk to you. One of the potential risks in this type of study may be a breach of confidentiality. To minimize that risk to you, no identifying information will be collected in the survey; thus, the survey is completely anonymous. After all surveys are collected, each survey will be assigned a numerical number and stored in the researcher’s locked office. All surveys will be analyzed and the results will be aggregated (summed) to show group level patterns and not individual patterns. After 5 years, all surveys will be shredded.

Are there any benefits to me?: There are no direct benefits to you for participating in this study. The primary benefit of the study is that the information obtained can be used by health and rehabilitation professionals to improve health promotion interventions for African Americans living with HIV/AIDS.

How will my confidentiality be protected?: This study is anonymous. Neither your name nor any other identifiable information will be collected.

Whom should I contact if I have questions?: You may ask any questions about the research at any time. If you have questions about the research, you should contact the Principal Investigator Ruth Lynch, Ph.D. at (608)-263-7785 or call the student researcher, Ebonee Johnson, M.S. at (608)-381-5878. If you are not satisfied with the response of the research team, have more questions, or want to talk with someone about your rights as a research participant, you should contact the Health Sciences Institutional Review Board at (608)-263-2362. Your participation is completely voluntary and anonymous. If you decide not to participate or to withdraw from the study, it will have no effect on any services or treatment you are currently receiving.

Receipt of your completed survey will indicate that you consent to participate in this study. Thank you for your time and help in conducting this study.
### Appendix D

**Survey**

#### Demographic Information

1. **Please respond yes or no to the following statements.**
   - I identify as Black or African American: [ ] Yes [ ] No
   - I have a diagnosis of HIV or AIDS: [ ] Yes [ ] No

2. **What is your HIV status?**
   - HIV+, with symptoms [ ]
   - HIV+, with no symptoms [ ]
   - AIDS [ ]

3. **What is your most recent CD4 T-cell count?**

4. **What is your most recent viral load count?**

5. **Gender**
   - Male [ ]
   - Female [ ]
   - Transgender [ ]

6. **Sexual orientation/behavior (may choose more than one)**
   - Straight [ ]
   - Gay [ ]
   - Bisexual [ ]
   - MSM [ ]
   - Other (please specify): ____________________________

7. **Age**

8. **Height**
   - Feet and inches: ____________________________

9. **Weight**
   - Pounds: ____________________________

10. **Waist measurement**
    - Approx. in inches: ____________________________

11. **Marital Status:**
    - Single [ ]
    - Divorced [ ]
    - Married or in a significant long-term relationship [ ]
    - Widowed [ ]
12. What is your highest level of education?

- [ ] No formal education
- [ ] Some grade school
- [ ] Grade school graduate
- [ ] Some high school
- [ ] High school graduate
- [ ] Some college
- [ ] College graduate
- [ ] Graduate school

13. Which option(s) best describe(s) your current employment situation?

- [ ] Employed full-time
- [ ] Employed part-time
- [ ] Unemployed, seeking employment
- [ ] Retired or not seeking employment
- [ ] Volunteer, full-time
- [ ] Volunteer, part-time

14. What is your annual household income in dollars? (an estimate is fine)

[ ]

15. Please choose the job category that best describes your current or most recent career.

- [ ] Laborer
- [ ] Student
- [ ] Service worker
- [ ] Operator
- [ ] Craftsman
- [ ] Clerical sales
- [ ] Manager
- [ ] Professional

16. Do you have the following health insurance:

- [ ] Private insurance through employment
- [ ] Private insurance through other means
- [ ] Medicare
- [ ] Medicaid
- [ ] Other (please specify)
### HIV Symptom Index

17. The following questions ask about symptoms you might have had during the past four weeks. Please mark the box that describes how much you have been bothered by each symptom.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>I do not have this symptom</th>
<th>It doesn't bother me</th>
<th>It bothers me a little</th>
<th>It bothers me</th>
<th>It bothers me a lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue or loss of energy?</td>
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<tr>
<td>Fever, chills, or sweats?</td>
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<tr>
<td>Feeling dizzy or lightheaded?</td>
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<tr>
<td>Pain, numbness or tingling in the hands or feet?</td>
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<td>Trouble remembering?</td>
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<tr>
<td>Nausea or vomiting?</td>
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<tr>
<td>Diarrhea or loose bowel movements?</td>
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<td>Felt sad, down, or depressed?</td>
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<tr>
<td>Felt nervous or anxious?</td>
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<tr>
<td>Difficulty falling or staying asleep?</td>
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<tr>
<td>Skin problems, such as rash, dryness or itching?</td>
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<tr>
<td>Cough or trouble catching your breath?</td>
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<tr>
<td>Headache?</td>
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<tr>
<td>Loss of appetite or a change in the taste of food?</td>
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<tr>
<td>Bloating, pain, or gas in your stomach?</td>
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<tr>
<td>Muscle aches or joint pain?</td>
<td></td>
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<tr>
<td>Problems having sex, such as loss of interest or lack of satisfaction?</td>
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<tr>
<td>Changes in the way your body looks such as fat deposits or weight gain</td>
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<tr>
<td>Problems with weight loss or wasting?</td>
<td></td>
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<tr>
<td>Hair loss or changes in the way your hair looks?</td>
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</tbody>
</table>
### Health/Safety Risk Perceptions Scale

18. For each of the following statements, please indicate how risky you perceive each situation. Provide a rating using the following scale.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all risky</th>
<th>Moderately risky</th>
<th>Extremely risky</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consuming 5 or more servings of alcohol in a single evening.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Regularly eating high cholesterol foods.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Buying an illegal drug for your own use.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Engaging in unprotected sex.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Not exercising regularly (e.g., walking briskly for at least 30 minutes a day, 3 times a week)</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>19. Which intentions do you have for the next weeks and months? I intend to...</td>
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<tr>
<td>---------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>...live a healthier life.</td>
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<tr>
<td>...eat as healthy as possible.</td>
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<tr>
<td>...eat as less fat as possible (i.e. avoid fatty meat, cheese, etc.).</td>
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<tr>
<td>...do more for my health.</td>
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<tr>
<td>...quit smoking.</td>
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<tr>
<td>...eat low-salt food.</td>
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<tr>
<td>...drink less alcohol.</td>
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<tr>
<td>...participate in a medical examination for early detection of cardiovascular diseases.</td>
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<tr>
<td>...exercise regularly (at least once a week)</td>
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<tr>
<td>...lose weight.</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Don't intend at all</th>
<th>Strongly intend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
## Outcome Expectations for Exercise Scale

20. Please rate the following statements regarding your expectations about physical activity and exercise.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity and exercise make me feel better physically.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Physical activity and exercise make my mood better in general.</td>
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<tr>
<td>Physical activity and exercise help me feel less tired.</td>
<td></td>
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<tr>
<td>Physical activity and exercise make my muscles stronger.</td>
<td></td>
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<tr>
<td>Physical activity and exercise is an activity I enjoy doing.</td>
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<tr>
<td>Physical activity and exercise give me a sense of personal accomplishment.</td>
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<tr>
<td>Physical activity and exercise makes me more alert mentally.</td>
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<tr>
<td>Physical activity and exercise improves my endurance in performing my daily activities.</td>
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</tr>
<tr>
<td>Physical activity and exercise helps to strengthen my bones.</td>
<td></td>
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</tr>
</tbody>
</table>
### Action Self-Efficacy for Exercise Scale

**21. How certain are you that you can overcome the following barriers?**

<table>
<thead>
<tr>
<th>Question</th>
<th>Very uncertain</th>
<th>Rather uncertain</th>
<th>Rather certain</th>
<th>Very certain</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can manage to carry out my physical activity/exercise intentions, even when I have worries and problems.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I can manage to carry out my physical activity/exercise intentions, even when I am busy.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
### Maintenance Self-Efficacy for Exercise Scale

22. It is important to stay physically active. Are you confident you can manage that? I am confident that I am able to do physical exercises regularly, even if...

<table>
<thead>
<tr>
<th></th>
<th>Not at all true</th>
<th>Barely true</th>
<th>Mostly true</th>
<th>Exactly true</th>
</tr>
</thead>
<tbody>
<tr>
<td>...I do not see any positive effects of exercise.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>...exercising takes me a lot of time.</td>
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<tr>
<td>...I have to force myself to do them again everyday.</td>
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</tr>
<tr>
<td>...I am tempted to do something else.</td>
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<td></td>
</tr>
</tbody>
</table>
### Action & Coping Planning Scale for Exercise

23. **Do you already have concrete plans for exercising?**

<table>
<thead>
<tr>
<th></th>
<th>Not at all true</th>
<th>Barely true</th>
<th>Mostly true</th>
<th>Exactly true</th>
</tr>
</thead>
<tbody>
<tr>
<td>I already have concrete plans when to exercise.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I already have concrete plans where to exercise.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I already have concrete plans how to exercise.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I already have concrete plans how often to exercise.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I already have concrete plans with whom to exercise.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I already have concrete plans what to do if something intervenes.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I already have concrete plans what to do if I miss an exercise session.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I already have concrete plans what to do in difficult situations in order to stick to my intentions.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I already have concrete plans when to especially watch out in order to stay committed.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
**Recovery Self-Efficacy Scale for Exercise**

24. Imagine you have stopped exercising for some time. How confident are you about restarting exercises?

I am sure I can be physically active again regularly, even if...

<table>
<thead>
<tr>
<th>Situation</th>
<th>Not at all true</th>
<th>Barely true</th>
<th>Mostly true</th>
<th>Exactly true</th>
</tr>
</thead>
<tbody>
<tr>
<td>If I had failed to pull myself together to exercise.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>If I feel weak after illness period.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>If I haven’t done exercises for a couple of days.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
### Barriers to Health Promoting Activities for Disabled Persons Scale

25. People sometimes have problems doing what they want to do to stay healthy. Please choose the circle that best indicates how much each of these problems keeps you from taking care of your health.

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Routinely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of convenient facilities.</td>
<td></td>
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<tr>
<td>Too tired.</td>
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<tr>
<td>Lack of transportation.</td>
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<tr>
<td>Feeling like what I do doesn’t help.</td>
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<tr>
<td>Lack of money.</td>
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<tr>
<td>Impairment.</td>
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<tr>
<td>No one to help me.</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Not interested.</td>
<td></td>
<td></td>
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<tr>
<td>Lack of information.</td>
<td></td>
<td></td>
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<tr>
<td>Embarrassment about my appearance.</td>
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<tr>
<td>Concern about safety.</td>
<td></td>
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<tr>
<td>Lack of support from family/friends.</td>
<td></td>
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<tr>
<td>Interferes with other responsibilities.</td>
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<tr>
<td>Lack of time.</td>
<td></td>
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<tr>
<td>Feeling I can’t do things correctly.</td>
<td></td>
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<tr>
<td>Difficulty with communication.</td>
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<tr>
<td>Bad weather.</td>
<td></td>
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</tr>
<tr>
<td>Lack of help from health care providers.</td>
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</tbody>
</table>
Friend and Family Support for Exercise Habits

26. Please rate the frequency with which friends or family members did or said what is described in each item over the last 3 months on a scale from "never" to "very often".

<table>
<thead>
<tr>
<th>Item</th>
<th>1-Never</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5-Very often</th>
</tr>
</thead>
<tbody>
<tr>
<td>My friend exercised with me.</td>
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</tr>
<tr>
<td>My friend offered to exercise with me.</td>
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<tr>
<td>My friend gave me helpful reminders to exercise.</td>
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</tr>
<tr>
<td>My friend gave me encouragement to stick with my exercise program.</td>
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<tr>
<td>My friend changed their schedule so we could exercise together.</td>
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<tr>
<td>My family member exercised with me.</td>
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</tr>
<tr>
<td>My family member gave me encouragement to stick with my exercise program.</td>
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</tr>
<tr>
<td>My family member changed their schedule so we could exercise together.</td>
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</tr>
<tr>
<td>My family member offered to exercise with me.</td>
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</tr>
<tr>
<td>My family member gave me helpful reminders to exercise.</td>
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<tr>
<td>My family member planned for exercise on recreational outing.</td>
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<tr>
<td>My family member discussed exercise with me.</td>
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<tr>
<td>My family member talked about how much they like to exercise.</td>
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<tr>
<td>My family member helped plan activities around my exercise.</td>
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</tr>
<tr>
<td>My family member asked me for ideas on how they can get more exercise.</td>
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<tr>
<td>My family member took over chores so I had more time to exercise.</td>
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<tr>
<td>My family member made positive comments about my physical appearance.</td>
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</tr>
<tr>
<td>My family member got angry at me for exercising.</td>
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<tr>
<td>My family member criticized me or made fun of me for exercising.</td>
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<tr>
<td>My family member gave me rewards for exercising.</td>
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</tbody>
</table>
**Physical Activity Stages of Change Instrument**

27. For physical activity to be regular, it must be done for 30 minutes at a time (or more) per day, and be done at least 4 days per week. For example, you could take a 30-minute brisk walk or ride a bicycle for 30 minutes. Physical activity includes such activities as walking briskly, biking, swimming, line dancing, and aerobics classes or any other activities where the exertion is similar to these activities. Your heart rate and/or breathing should increase, but there is no need to exhaust yourself. Please answer all questions with either Yes or No.

**According to the definition above:**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you currently engage in regular physical activity?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you intend to engage in regular physical activity in the next 6 months?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you intend to engage in regular physical activity in the next 30 days?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you been regularly physically active for the past 6 months?</td>
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</tbody>
</table>
### Ironson-Woods Spirituality/Religiousness Index-Short Form

28. How strongly do you agree or disagree with the following statements reflecting your spiritual/religious beliefs and practices?

<table>
<thead>
<tr>
<th>Statement</th>
<th>1-Strongly Disagree</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5-Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My beliefs give me a sense of peace.</td>
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<tr>
<td>My beliefs help me to know everything will be fine.</td>
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<tr>
<td>My beliefs give meaning to my life.</td>
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<tr>
<td>My beliefs help me to be relaxed.</td>
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<tr>
<td>My beliefs help me to feel protected.</td>
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<tr>
<td>My beliefs help me to feel I am not alone.</td>
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</tr>
<tr>
<td>My beliefs help me to feel I have a relationship or a connection with a higher form of being.</td>
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</tr>
<tr>
<td>My beliefs help me to be less afraid of death.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe my soul will live on in some form after my body dies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe God created all things in the Universe.</td>
<td></td>
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<tr>
<td>God will not turn his back on me no matter what I do.</td>
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<tr>
<td>When I am ill, God gives me courage to cope with my illness.</td>
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<tr>
<td>When I am ill, God will answer my prayers for a recovery.</td>
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<tr>
<td>My beliefs are very influential in my recovery when I am ill.</td>
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<tr>
<td>When I am ill, my faith gives me optimism that I will recover.</td>
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<tr>
<td>I attend religious services.</td>
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<tr>
<td>I participate in religious rituals.</td>
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<tr>
<td>I pray or meditate to get in touch with God.</td>
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<tr>
<td>I discuss my beliefs with others who share my belief.</td>
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<tr>
<td>My beliefs give me a set of rules I must obey.</td>
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<td>------------------------------------------------</td>
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</tr>
<tr>
<td>My beliefs teach me to help other people who are in need.</td>
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<tr>
<td>My beliefs help me feel compassion/love/respect for others.</td>
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</tbody>
</table>
29. In general, would you say your health is:

<table>
<thead>
<tr>
<th></th>
<th>excellent</th>
<th>very good</th>
<th>good</th>
<th>fair</th>
<th>poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>circle</td>
<td>circle</td>
<td>circle</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

30. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes, limited a lot</th>
<th>Yes, limited a little</th>
<th>No, not limited at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate activities such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.</td>
<td></td>
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</tr>
<tr>
<td>Climbing several flights of stairs.</td>
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</tr>
</tbody>
</table>

31. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regularly daily activities as a result of your physical health?

<table>
<thead>
<tr>
<th>Problem</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accomplished less than you would like.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were limited in the kind of work or other activities.</td>
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</tr>
</tbody>
</table>

32. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

<table>
<thead>
<tr>
<th>Problem</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accomplished less than you would like.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did work or other activities less carefully than usual</td>
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</tr>
</tbody>
</table>

33. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the house and housework)?

<table>
<thead>
<tr>
<th>Level of pain</th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>circle</td>
<td>circle</td>
<td>circle</td>
<td>circle</td>
<td>circle</td>
<td>circle</td>
</tr>
</tbody>
</table>

34. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

<table>
<thead>
<tr>
<th>Feeling</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>have you felt calm and peaceful?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>did you have a lot of energy?</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>have you felt downhearted and depressed?</td>
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</tr>
</tbody>
</table>
35. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

<table>
<thead>
<tr>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>