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## An investigation of the relationship between religiosity and subjective well-being in older adults: The mediating role of optimism

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An Investigation of the Relationship Between Religiosity and Subjective Well-Being in  
Older Adults: The Mediating Role of Optimism

by

Teri A. Trede

A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
Department of Community and Family Health  
College of Public Health  
University of South Florida

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## Dedication

This dissertation is dedicated to the many 'older' adults that inspired me to undertake this odyssey – Rose, Evelyn, Hazel, Jack, Betty, Henrietta, Clayton, Hilda, Audrey, Floree, Dottie, Ken, Martha, Helen, Joyce, Lois, Betty, Dorothy and so many more. Though many of you have passed from this life, your reverence for life, courage, wisdom, compassion and selfless dedication to others will inspire me for a lifetime. And to my father, I'm so sorry that your journey ended before mine – I so wish that you were here to celebrate this achievement with me.

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Abstract

The proportion of adults aged 65 and older in the United States has been increasing steadily for years. Although most would agree that this increased longevity is a remarkable achievement, there is growing concern regarding the resources that will be necessary to provide care and services for this rapidly expanding segment of the population. From a public health perspective, simply increasing longevity is no longer the ultimate outcome sought. A more pertinent goal is increasing the quality of life years, or promoting resilience and successful aging. Strategies that assist adults in delaying the onset of disability or reducing the severity of disabling conditions may serve a vital role in the promotion of resilience and successful aging in older adults. The purpose of this study was to explore the association between religiosity and subjective well-being, commonly identified as a marker of resilience in older adults. In addition, the study sought to determine if that association is mediated by optimism. For this study, subjective well-being was operationalized with measures of depressive symptomatology and life satisfaction. Secondary analyses were conducted on longitudinal data collected for the Florida Retirement Study. Results indicated that religiosity was not significantly associated with future depressive symptomatology, but was significantly associated with future life satisfaction. Dispositional optimism did not mediate the relationships between religiosity and subjective well-being variables.

## Chapter One

### *Introduction*

*To know how to grow old is the master work of wisdom, and one of the most difficult chapters in the great art of living*

*(Henri Amiel, 1874)*

### *Statement of the Problem*

It is well documented that the United States is undergoing a dramatic demographic shift. The proportion of adults aged 65 and older has been increasing steadily for the past four decades (Coughlin, 1999). A long-term decline in fertility rates and enormous improvements in life expectancy have combined to reshape the demographic structure of the United States. No longer is our national demographic structure adequately represented by a pyramid structure, with elderly citizens occupying the smallest, upper segments. Rather, the demographic structure now is more adequately represented as a rectangle, with older adult proportions more equal in size to younger segments of the population. This change in demographics clearly reflects the trend of increased longevity that will ultimately redefine the demographic map of our country, with elderly citizens emerging as one of the most rapidly growing segments of our population. With 46% of the population already surviving to at least 80 years of age, and with forecasts predicting a possible rise in life expectancy to 86 in the year 2065 (Lee & Carter, 1992), it is important that we focus attention on the health and well-being of the increasing elderly population.



Conventional definitions of the elderly population generally regard adults between the ages of 65 and 74 as young-old, those 75 to 84 as old, and individuals older than 85 as the oldest-old. The number of older people in the population is expected to double over the next 20-30 years (Syme, 2003). By 2040, there will be 68 million persons over the age of 65 years of age in the U.S. (Fowler, 1997). The number of persons living to 75 and beyond will grow to 30 million by 2030, and those aged 85 and older will increase to 8 million. In 2015, the “Baby Boomers,” a cohort of 74 million Americans born between 1946 and 1964, will begin to join the ranks of the 65 and over population (Binstock, 1997). It has been estimated that each day, approximately 6,000 members of that cohort will turn 65, and that by the year 2025, the 65 and older age group will comprise nearly 19% of the total population, a far greater percentage than that of 1900, when those 65 and older accounted for only 4% of the population (Hirsch, 1999; Kerschner & Pegues, 1998). The cohort of adults turning 65 in 2020 is projected to live an average of 19.1 years past their 65<sup>th</sup> birthday (Lubitz, Beebe, & Baker, 1995).

### *The Graying of America*

This marked expansion of the 65 and over population presents an even greater imperative when considering that, within that group, those 85 years and older (the oldest-old), those most likely to need health care supportive services, are the most rapidly growing portion of the population. It has been estimated that this segment of the population could increase to 8.6 million by the year 2030 and almost double again by the year 2050 (Bauman, Adams, Waldo, 2001; Spencer, 1989; U.S. Census Bureau, 2000). As Siegel (1996) pointed out, this is a projected growth in excess of four hundred percent, resulting in the oldest old comprising some

5% of the total population of the United States in 2050 compared to the 1.4% of the population that they make up today.

Most authorities would agree that increased longevity is a remarkable achievement of modern medical science and technology. Billions of dollars have been invested over the past century to improve nutrition, ameliorate public sanitation, advance health care and medical technology, prevent epidemics, and reduce diseases and infections. As a result of these efforts, the average lifespan in this country has increased from 47 years in 1900, to over 77 years today, and that figure is projected to increase to 83 years by the year 2050 (Rowe & Kahn, 1998). However, though recognized as an extraordinary achievement, rapid growth of the elderly population also has generated apprehension regarding the resources necessary to provide care and services for these individuals (Baltes & Carstensen, 1996). Guralnik and colleagues (1996) note that whereas increased longevity is significant, it does not come without consequences. They point to the fact that while many people may escape death due to conditions that often claimed the lives of previous generations, such as infectious diseases, vast numbers of adults may now survive to ages where they suffer from chronic, disabling diseases. They emphasize that as the proportion of adults surviving to very old ages increases, the public health impact and burden of disease and disability, and the ability of older persons to function independently in the community have become critically important issues. Syme (2003) warns that the system of medical care, already struggling to meet health care demands, will be overwhelmed within the next 40 years as the number of older adults continues to increase. Rather than wait for medical care to solve resulting problems after the fact, Syme stresses that we must vigorously explore creative and effective strategies aimed at preventing disability and promoting health.

Other researchers, such as Campion (1998), see the demographic changes as rectangularization of the survival curve, due to the increasing number of deaths occurring after the age of 75. Campion contends that, despite some hesitancy about the quality of life in advanced decades (70s, 80s, and 90s), most individuals want to achieve such longevity. Despite medical advancements that make such achievements possible, he cautions that one must avoid casting normal aging as a chronic condition that is managed with expensive medications, endless tests and screenings, and worthless interventions.

In addition to living longer, larger numbers of persons are retiring at earlier ages. Thus, as life expectancy continues to increase, a growing number of individuals enter a period of expanded post-retirement years (Fisher, Mueller, & Cooper, 1991) – years when the majority of them will no longer be working for a salary and contributing to Social Security. Data from the 2000 Board of Trustees, Federal Hospital Insurance Trust Fund illustrates this point: in 1999 there was about one Medicare enrollee for every four workers, with annual expenditures per enrollee running about 18% (\$5,400) of the average annual wage (\$30,200); projections for 2075 show that there will be about one enrollee for every two workers, with costs per enrollee estimated to be about 24% of the average annual wage (Miller, 2001). Since life expectancy at age 65 is now 17+ years, in many cases, individuals could be drawing retirement benefits that actually exceed those that they contributed during their employment years. Thus, this rapid growth in the number both of retired persons and of the oldest old has generated much apprehension in regard to the resources and services that these individuals may need as they move through their elder years.

### *Longevity vs. Quality of Life*

From a public health and aging perspective, simply increasing longevity is no longer the ultimate outcome sought. A more pertinent goal is increasing the quality of life years – adding life to years, not just adding years to life, or more simply put, promoting successful aging. Fries (1980) suggested that goals related to preventive gerontology should be posed in terms of *compression of morbidity*, compressing the total period of infirmity or disability into a shorter period toward the end of life, rather than merely expanding the average life span. Fries' hypothesis challenged the predominant stereotype of old age as a time of decline, helplessness and disability. Instead, he asserted that healthful living could make it possible for aging adults to survive to an advanced age while maintaining their vigor and functional independence (Campion, 1998; Fries, 1980). Thus, rather than simply channeling resources into postponing death, a much wiser strategy would be to focus efforts on reducing the period of infirmity before death (Fries, 1980). By concentrating efforts within the compression paradigm the national burden of illness, increasing because of the growing number of elderly individuals in the population, may be offset to some extent by a reduced average illness burden for the individual. This, in turn, could facilitate increased stability of the health care system (Fries, 2003).

Other researchers have not been as optimistic as Fries (1980). The compression of morbidity hypothesis has met with criticism for its naïvely optimistic approach to the impending challenge to the future of our aging population. Many demographers and health policy professionals operate from a *failure of success* paradigm, believing that although medical progress is indeed prolonging life, the resulting months and years could be spent in poorer health (Fries, 1980, 2003; Gruenberg, 1977; Rutter & Rutter, 1993). Similarly, Rutter and Rutter

(1993) noted that improvements in overall health are likely to mean that people will live longer, but argued that there does not seem to be much point in prolonging life if it results in decreased independence, declining health, a prolonged vegetative existence and burdensome healthcare costs (p.339). A similarly pessimistic view suggests that medical advances may be more successful in prolonging life than in postponing morbidity, resulting not in compression of morbidity, but in *expansion* of morbidity (Olshansky, Rudberg, Cassel, & Brody, 1991). For example, many individuals in their 80s and 90s are subject to several life-threatening conditions at once, but delaying the emergence of a single disease for as many as five years in such individuals, disability, suffering and the cost of medical care can be dramatically reduced (Rowe & Kahn, 1998; p.67).

#### *Need for the Study*

Few would argue that we have made enormous strides in lengthening the average lifespan of individuals in our population. However, it could be argued that we have been less successful when it comes to perfecting strategies to ensure quality of life. As the number of people surviving well beyond the traditional retirement age of 65 continues to swell, attention will increasingly be turned to concerns about achieving increased quality of life and well-being. By examining a range of indicators of subjective well-being and resilience, and elucidating mechanisms that influence such positive outcomes in elders, we can identify factors that have the potential to increase quality of life for older adults. Two increasingly studied determinants of well-being are religious involvement and optimistic orientation, both of which have been shown to be clearly associated with well-being and depression. The idea that religion and optimism are linked has long been established in social sciences (Tiger, 1999). Despite the hypothesized link

between them however, few empirical studies have explicitly examined the relationship between them (Mattis, Bontenot, & Hatcher-Kay, 2003). Fewer still have specifically explored the possibility that optimism may mediate the relationship between religiosity and subjective well-being indicators (Salsman, Brown, Brechting, & Carlson, 2005). A greater understanding of these relationships, and further elucidation of mechanisms of their influence, will likely inspire the development of interventions to promote improved life satisfaction and quality of life in elderly adults. For example, if it is discovered that religiosity operates through optimism to promote positive outcomes and perspectives in older adults, then interventions aimed at instilling a sense of hope and optimism may be beneficial for adults who are less religiously involved or who, due to advancing age and infirmity, find it necessary to disengage from religious activity. In particular, longitudinal research is needed in order to provide a clearer understanding of the temporal manner in which these factors operate and relate to one another.

#### *Implications for Public Health*

Both the needs for services and health care expenditures tend to rise with age. However, strategies that assist adults in achieving longevity and delaying the onset of disability or reduce the severity of disabling conditions may increase an individual's ability to remain independent in the community. It seems logical that costs for care would generally be greatest in the last years of life. There are studies, however, that have demonstrated that costs associated with the final year of life actually seem to *decline* with age. Lubitz, et al., (1995) used Medicare data to determine that in the last two years of life for persons who died at 101 years of age or older, costs for medical care were 37% (\$8,296) of those incurred by persons who died at age 70 (\$22,590). Miller (2001), also using Medicare data, found that those dying at age 75 incurred

costs of \$13,500, whereas those dying at age 95 incurred costs of \$7,000. Thus, increases in longevity appear to delay the high costs associated with the final years of life (Miller, 2001).

Aging individuals who are able to remain independent make notably fewer demands upon the health care system (Roos & Haven, 1991), and, in general, demonstrate higher life satisfaction. Additionally, despite the fact that the elderly account for over one-third of health care spending in the U.S., the average annual Medicare payments are lower for those persons who die at advanced ages (e. g., 80-90 years of age) (Lubitz, et al., 1995). The importance of assisting aging adults in remaining independent is clearly illustrated by the fact that 99% of the population under the age of 75, and 80% of those 85 and older, are residing in the community, not in nursing homes or other long-term care institutions (Hirsch, 1999). Approximately 45 persons per 1000 aged 65 or older actually reside in nursing homes (Guttman, 2000). Nursing home costs account for about 20 percent of health care spending for the elderly, and increase with age (Lubitz, et al., 1995). Reducing the need for nursing home utilization is a critical issue, given current projections that Medicare expenditures will outpace revenues prior to the end of the first quarter of the 21<sup>st</sup> century (Medicare Trustees, 2003; Roberts, 2003).

Thus, as the numbers of aging adults continues to increase, the elderly represent potential consumers of public health and medical care services in a system already challenged by the increasingly complex needs of a heterogeneous population. Strategies or factors that provide protection against the negative declines and losses associated with aging, or that promote resiliency and optimal adjustment in the face of the challenges of aging, have the potential to reduce the burden on the public health system and increase the numbers of elders who are able to successfully negotiate the aging process.

### *The State of Gerontological Research on Aging*

For much of its history, gerontological research has primarily focused on declines and losses associated with advancing age. Within the last decade several conceptual models have been proposed that have enriched successful aging studies with older adults, an area that was formerly criticized for the lack of theoretical development. The contribution of such research to our knowledge and understanding of the aging process is immeasurable. However, there remains a lack of consensus among researchers related to the maximum potential of the human aging process, the definition of successful aging and appropriate operationalization of its constructs. It is apparent that old age does indeed encompass losses in physical, cognitive and social domains and, therefore, it is not surprising that aging is accompanied by anxiety and fear both for individuals (e.g., fear of loss) and societies (e.g., fears of financial burdens) (Baltes & Carstensen, 1996). Such concerns are not without merit. However, there is growing evidence that such homogeneous views of aging are unidimensional and do not take into consideration the possibilities for adaptation, growth, and vitality, and enormous variability in the aging process. Maddox (1987) argues that by focusing on more narrow, theoretically normative outcomes, inadequate attention is paid to the heterogeneity among and within aging adults. Other researchers have been more pointed in their criticism, suggesting that aging research needs to include multidimensional and multilevel outcomes that consider both losses and gains (Baltes & Carstensen, 1996). Inui (2003) contends that successful aging is not adequately understood as mere longevity, and that any attempts to define it must include sufficient well-being in a number of domains (mental, physical, social, spiritual, economic) to sustain the ability to adapt to changes in one's life successfully. Inui stresses the need for a biopsychosocial research approach



to the study of successful aging that is driven by transdisciplinary thinking that recognizes the complexity and wide variety of determinants of health and well-being in older adults.

Given the growing recognition of the multidimensional aspects of aging successfully, it seems pertinent to expand the research inquiry beyond asking “what is successful aging?” to explore the mechanisms through which people cope with increasing limitations or remain resilient in the face of adversity. Thus, a more germane question may be, “*how* do people age successfully?” For example, more recent gerontological research suggests that certain individuals demonstrate the ability to maintain or regain normal levels of functioning following adverse life experiences (Staudinger, Marsiske, & Baltes, 1993; Wallace, Bisconti, & Bergeman, 2001). These individuals are thought to possess some combination of internal (e. g., personality and dispositional characteristics, self-esteem, religiosity) and external resources (e. g., social support, social engagement, prosocial behaviors such as voluntary participation and health promotion activities) that serve as protective factors that enhance their resilience and promote more optimal or successful aging.

Longitudinal data, in particular, offer the opportunity to identify both characteristics and behavioral patterns of people who demonstrate the ability to successfully adapt to, or postpone declines associated with the aging process successfully, and to begin to delineate the mechanisms through which they achieve their resilience. Identifying factors governing resilience in the face of challenges or adversity is an important step in assisting future aging elders in achieving quality of life in their later years. In identifying resilience factors, it may be particularly advantageous to differentiate between protective factors that are likely to be innate individual characteristics (such as dispositional characteristics), and protective mechanisms that may be

developed throughout the life span (such as prosocial behaviors). Such insights will advance knowledge in the field of aging and provide further evidence upon which to design interventions aimed at assisting adults in maintaining or developing resources to enhance late life resiliency, which can be considered a hallmark of successful aging.

### *Purpose of Study*

The purpose of this study was twofold. First, the study was designed to explore the extent to which religious involvement predicts subjective well-being in elderly adults. The second purpose was to determine the extent to which the association between religiosity and indicators of subjective well-being in elderly adults is mediated by dispositional optimism.

There is significant research supporting the association between sociodemographic, psychological and physical well-being, and dispositional traits and successful aging or resilience outcomes. Similar associations have been demonstrated between prosocial behavior, such as religious involvement, and resilience or successful aging. Determination of causal mechanisms accounting for these relationships has been more problematic. There is growing evidence suggesting that there may be more specific mechanisms through which prosocial behaviors actually confer their effects on resiliency and subjective well-being outcomes. Explicating the degree to which these variables contribute to subjective well-being in the elderly may be important for understanding individual differences in more positive outcomes in later life.

### *Conceptual Model*

The conceptual model for this study (see Figure 1) was built upon the premise that after controlling for appropriate confounders, religiosity would predict greater levels of subjective well-being in elderly adults. It was further posited that optimism would mediate the association

between religiosity and subjective well-being in elderly adults. In other words, it was hypothesized that, when optimism was added to the analytic model, not only would a greater proportion of variance be accounted for, but the influence of religiosity on the dependent variables would be reduced, thus providing a more specific explanation of religiosity's effects. The study model included as control variables and covariates: sociodemographic variables, baseline health and functional ability, and measures of baseline depression, life satisfaction and positive and negative affect. Religiosity was the independent variable in this study and was measured at Time 1. The dependent variable, subjective well-being, was operationalized as measures of Time 10 life satisfaction and Time 10 depressive symptomatology.

#### *Research Questions*

1. Is there a positive association between religiosity and subjective well-being in elderly adults?
2. Is the association between religiosity and subjective well-being in elderly adults mediated by optimism?

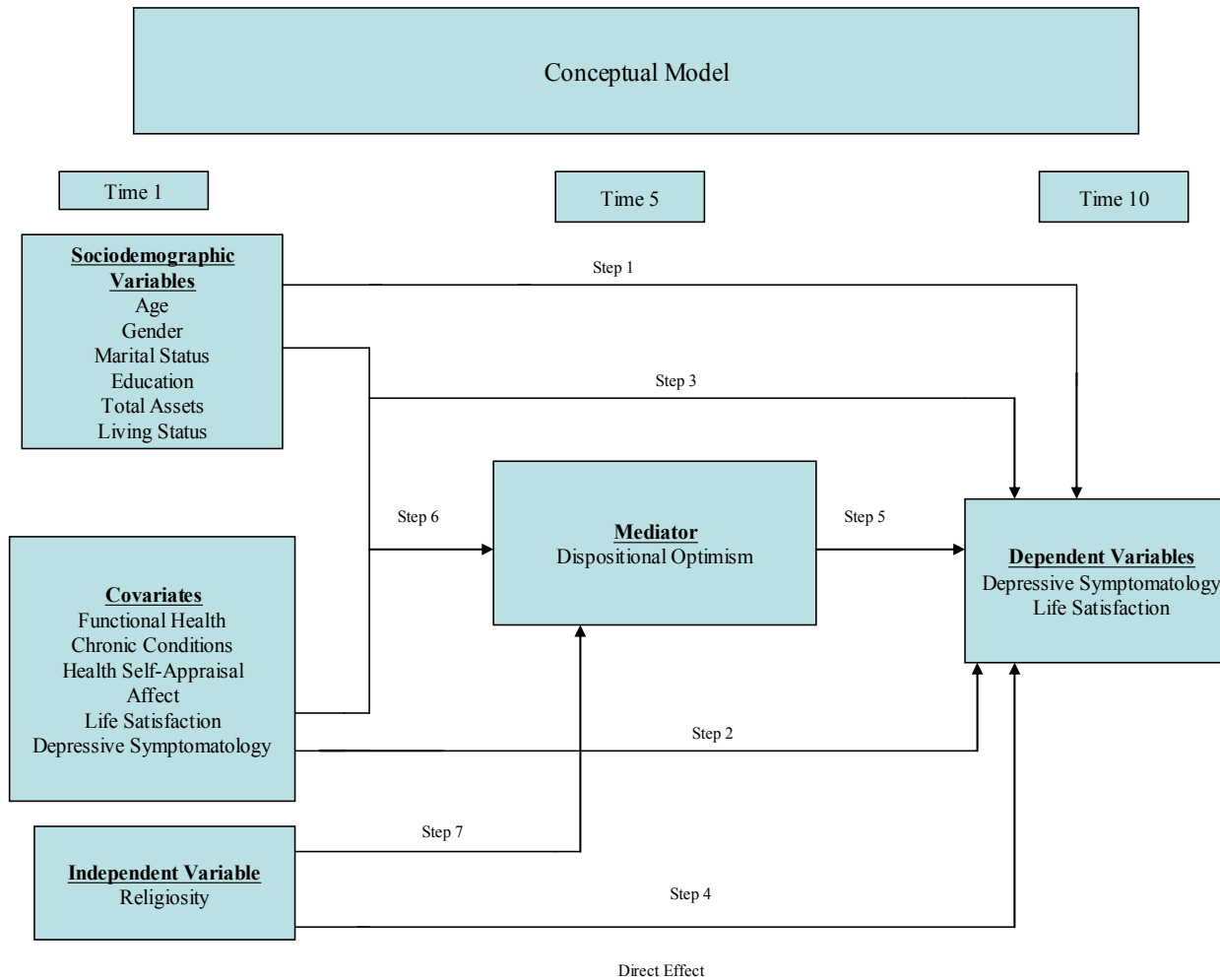


Figure 1. Conceptual Model

### *Overview of Study Methods*

This study was based on secondary analysis of data from an ongoing National Institute on Aging-funded longitudinal study of late-life adaptation to aging conducted by the Elderly Care Research Center of Case Western Reserve University. The study, originally entitled, *Buffers of Impairment/Disability Cascade Among Old-Old*, is currently in its 16<sup>th</sup> year. Initial data collection began in 1989 with 1000 adults randomly selected from within a large, age-segregated, retirement community in Clearwater, Florida. As a result of eligibility criteria established for the study, the study sample consists entirely of elderly adults. Initial eligibility criteria required that participants be at least 72 years old, reside in Florida at least 9 months of the year, and be free of major mental and physical infirmities (Kahana, et al., 2002). The mean age of respondents in the first wave of the study was 79.3 years (Kahana & Kahana, 2002).

Respondents are interviewed annually in their homes by a trained interviewer. Each interview utilizes a comprehensive interview instrument that takes between 1 1/2 and 2 1/2 hours to complete. The longitudinal nature of this study and the comprehensiveness of the data collection permit the investigation of the effects of prosocial behaviors on resilience outcomes utilizing multidimensional measures. Initial eligibility criteria provided natural controls for a number of factors identified in previous research as possible threats to create spurious results (e.g., age, functional limitations, lack of residency, income).

### *Research Hypotheses*

This study tested the following hypotheses:

1. Religiosity is positively associated with subjective well-being in elderly adults, after controlling for sociodemographic factors, baseline health and function, and baseline measures of life satisfaction, depressive symptomatology and positive and negative affect.
2. The association between religiosity and subjective well-being in elderly adults is mediated by optimism after controlling for sociodemographic factors, baseline health and function, and baseline measures of life satisfaction and positive and negative affect.

### *Delimitations*

Delimitations describe the population to which study results may be generalized (Locke, Wyrlic-Spirduso, & Silverman, 2000). The following delimitations are imposed on this study:

1. Data analysis for this study will be based only on data for residents who reside in one age-segregated Florida retirement community. The vast majority of respondents participating in the waves of data chosen for this study are Caucasian. Although the lack of diversity in the sample could be seen as reducing generalizability to the population as a whole, the data are generally representative of current residential populations of Florida retirement communities.

2. Results are only generalizable to elderly, non-institutionalized adults and their families who participated in all phases of data collection and had no, or minimal missing data for every variable included in the study.
3. Results are only generalizable to elderly adults who do not have elevated depressive symptomatology scores prior to data collection and analysis.
4. Results are generalizable only to White elderly adults. This is an important point since research has demonstrated that there are numerous differences between White, Black, Hispanic and other minority populations in such areas as health status, functional disabilities, religious involvement, and social structure, to name a few.
5. Results are only generalizable to elderly adults who have minimal functional limitations, including ADL / IADL disabilities, vision loss or hearing loss, restricting their ability to participate fully in activities outside their home.

#### *Limitations*

Limitations refer to limiting conditions or restrictive weaknesses inherent in the study design (Locke et al., 2000). The following are limitations of this study:

1. Participation in the original study from which the data were drawn was based upon random sampling of a specified community sample. Participation was voluntary, but subject to exclusion criteria that reduced the randomness of the final population enrolled in the study. Respondents had to be physically and mentally capable of submitting to a lengthy interview. These requirements may represent threats to the internal validity of the study in that they create selection bias. Thus, those who entered the study were in better health than those who were

excluded, and it may be that more positive outcomes are attributable to the fact that they were in better health to begin with. The relationships between the independent and dependent variables in the study might be affected by the selectivity of the individuals who are in the sample, or by pre-existing differences between groups in aspects related to the independent variables.

2. Survey results for the original study are based upon self report. Many of the questions contained in the instrument ask for self disclosure of sensitive information. Social desirability bias has been found to affect responses on such questionnaires and interviews. Social desirability is the tendency to present oneself in a good light to the researcher or interviewer and may provide normative responses or socially acceptable answers to questions rather than truthful answers (Nunnally, 2000). It is also possible that respondents' ratings of measures such as self-appraised health could have been influenced by social comparison bias whereby respondents formulated their responses based upon their perception of how they compared themselves to their peers rather than strictly on an objective appraisal of their health or well-being.
3. Participation in the original study may be influenced by the "worried well" phenomenon, whereby healthy, interested persons are more likely to participate in research than persons who may be more similar to the individuals that are actually targeted by the study. A more heterogeneous sample, one that included subjects who did not represent adults who may already be considered "successful agers" would increase generalizability and allow further extension of the research.



4. To increase explanatory power of this study, it would have been preferable to include a measure for spirituality. Much current research suggests that spirituality, often included among measures of religiosity, should be considered as a distinctly separate construct that may exert significant influence on the lives of many aging elders – not necessarily in conjunction with religious behaviors or involvement. However, the source data for this study did not include indicators of this construct in the waves that were analyzed.
5. Although the use of multi-wave panel data for this study allows for the establishment of temporal ordering of selected indicators and outcomes, one could argue that a complete understanding of the true predictive power of the indicators is impossible without accounting for their effects earlier in the lifespan. Although research demonstrates that dispositional optimism and global life satisfaction are relatively stable across the lifespan, it would be beneficial to investigate how levels of well-being and life satisfaction earlier in the lifespan influence aging outcomes. For example, it may be that high levels of well-being in early adulthood predict high levels of well-being in old age. Or it may be that well-being becomes more significant as one enters later stages of life when the challenges of aging increase and coping resources may decline. It may also be that, as elderly adults meet and successfully negotiate the challenges created by the aging process, they experience a boost in self-esteem and optimism which, in turn, enhances well-being. Such investigation is beyond the scope of this study due to the homogeneous, age restricted nature of the original study sample.

### *Definitions*

1. Activities of Daily Living (ADLs) – one of the key measures used to determine an individual’s ability to remain independent. ADLs provide a measure of an individual’s ability to manage their personal care and include basic functions such as dressing, bathing, toileting, feeding oneself, transferring from bed to chair, and walking.
2. Confounders - variables that may exert influence on either, or both, the independent and dependent variables, include sociodemographic variables, functional health status (ADLs, IADLs), and affect (PA/NA).
3. Depressive Symptomatology - symptoms of depression; may or may not be indicative of clinical depression.
4. Functional Limitations – impairment in those everyday activities that involve functioning in and out of the home, referred to as Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs). A person is disabled or dependent when he or she cannot perform some of these usual activities without assistance.
5. Instrumental Activities of Daily Living (IADLs) – a key measure to assess an individual’s ability to function independently in the community. IADLs assess an individual’s ability to perform non-personal care activities such as preparing meals, paying bills, using the telephone, cleaning the house, writing, or reading.
6. Life satisfaction - the conscious, cognitively judgmental process individuals use to assess the quality of their lives in accordance with their own unique set of criteria

7. Markers of Resilience – represented by the global construct of subjective well-being operationalized as a respondent’s perception of life satisfaction and depressive symptoms.
8. Optimism - refers to an individual’s perceptions of situations and expectations of favorable or positive outcomes over time.
9. Positive and Negative Affectivity (PA/NA) – generally considered to represent the emotional components of subjective well-being; two distinguishable dimensions composing mood. Positive affectivity reflects the extent to which individuals generally feel active, alert and enthusiastic, whereas negative affectivity reflects the extent to which individuals generally feel upset or unpleasantly aroused.
10. Proactive Behaviors – behaviors directed toward adjustment, coping and adaptation to the challenges older adults face as part of the aging process, such as religious involvement, social interactions, etc.
11. Religious Attendance – frequency of attendance of organized religious services.
12. Religiosity – a multidimensional construct encompassing religious affiliation, attendance, religious salience, solitary prayer, and religious attitudes and beliefs.
13. Religious Salience – a measure of private religious involvement and beliefs.
14. Resilience – describes an older adult’s ability to resist the challenges and forces of decline and deterioration associated with aging to maintain stable health and function; the ability to recover from losses and illness and regain stability in the face of stresses and challenges.

15. Sociodemographic Variables – control variables including age, gender, marital status, education, total assets.
16. Subjective well-being (SWB) – a multidimensional construct that represents an evaluation of how individuals evaluate their lives; includes measures of depressive symptomatology and life satisfaction.
17. Successful Aging – not merely the absence of disease, but rather, a multidimensional process that reflects optimal adaptation to the challenges, losses and changes presented by the aging process. This optimal adaptation includes the achievement and maintenance of high levels of subjective well-being, physical and mental health, engagement with life, and overall life satisfaction.

## Chapter Two

### *Background*

There has been increasing recognition that the process of aging is a complex process involving adaptation to physical, social and psychological changes that are intertwined with advancing age. Steverink and colleagues (1998) suggest that investigations of successful adaptation should incorporate a multi-disciplinary approach that utilizes indicators from multiple life domains. Successful aging research has indeed been undertaken in many disciplines and has included indicators from many life domains. However, there remains a lack of consensus about how to define successful aging, and precisely how to operationalize its components. Thus, comparison across studies has been difficult, if not impossible, and identification of mechanisms and processes that contribute to the successful aging of adults has been limited.

To develop a multidimensional model that draws upon facets from many fields of study, it is necessary first to explore the concepts, constructs and theoretical foundations that contribute to the components of the model. Conceptually, the framework of this study hypothesizes that specific factors, such as religious involvement, predict markers of resilience in older adults. These resilience factors are, in turn, believed to be important to the process of successful aging. To provide adequate context for the basis of this study, it will be necessary to explore literature relative to both successful aging and resilience. To begin, a brief history of theoretical attempts to define and describe both is provided. In

addition, literature will be reviewed that details the state of current knowledge related to the hypothesized associations among the variables included in the model for this study.

### *Successful Aging*

The stereotypical image of older adults has long been a negative one, evoking images of debilitating illness, impaired cognitive function, forgetfulness, isolation from society and despair. Old age often has been portrayed as a time characterized by multiple losses, deterioration, and lack of purpose and meaning. Fortunately, more positive conceptualizations of aging have become more common in the past two to three decades, and much of the fear of old age has begun to be tempered by illustrations of successful negotiation of the aging process.

### *Early Theories*

Definitions of success vary according to context in which the concept is being utilized. In general usage, success refers to desired achievement, attainment of goals, or as a measure of economic achievement. Some critics contend that successful aging is an oxymoron – that aging successfully implies not aging at all (Baltes & Carstensen, 1996). Very early theories of successful aging described highly idealized human states as the ultimate positive outcome of old age. For example, Jung (1931) identified criteria that account for successful aging: expansion beyond gender constraints toward full humanity, life review, psychological interiorization and wisdom. Bühler (1933) theorized that successful aging was accomplished with the acceptance of decline as the adaptive task of old age.

Later research related to successful aging drew direction from Talcott Parsons' (1951) Theory of Action, and Erikson's (1959) life span developmental theory (Ford, Haug, Stange, Gaines, Noelker, & Jones, 2000). Later, using results gathered in the Kansas City Study of Adult Life, Cumming and Henry (1961) suggested that, as they reach old age, adults begin to disengage as part of their adjustment to elderly life. They concluded that this withdrawal process was done by mutual agreement between the generations - that society, in general, accepted the notion that older adults should retire and relinquish roles and responsibilities to make way for younger generations (ie., free up jobs). The theory also assumes that as older adults move toward the last years of their life, they no longer desire or require engagement with society.

The Disengagement Theory was soon criticized by other researchers who posited a contrasting view of aging, suggesting that with advancing age, engagement, rather than disengagement, is more closely associated with well-being (Tobin & Neugarten, 1961). Lemon, Bengtson, and Peterson (1972) proposed in the Activity Theory that the key to successful aging is not found in withdrawing from life and shrinking from society, but rather, by maintaining a high level of both physical activity and social integration, findings that were replicated successfully a decade later by Longino and Kart (1982). Knapp (1977) suggested that the theory supports the natural tendency for aging adults to seek interactions with others, particularly in group or community activities. He concluded that older adults who participate in high levels of activity generally express more positive affect, and those who are less engaged express a higher level of negative affect. Thus, older adults who remain active and productive have better outcomes than do those who disengage from society (Gubrium, 1972; Herzog & House, 1991; Lemon, et al., 1972).

Activity Theory was used to demonstrate that activity supplies role support and opportunities for personal development in the elderly (Zimmer, Hickey, & Searle, 1995). For example, evidence has been provided by Coleman and Iso-Ahola (1993) that indicates that socially integrated activities that provide enhanced perceptions of social support and foster companionship act as a buffer against stressful life events.

### *Expansion of Successful Aging Theories*

Gerontological researchers have continued to explore and expand the concept of successful adaptation to old age (Aquino, Russell, Cutrona, & Altmaier, 1996; Bearon, 1996; Havighurst, 1961; Kerchner & Pegues, 1998; Larson, 1978; Lemon, et al., 1972; Palmore, 1979; Roos & Havens, 1981; Tobin & Neugarten, 1961; Wetle, 1997).

Although the concept of successful aging was initiated some years ago, the term was popularized in an article published in *Science* by Rowe and Kahn (1987) (Strawbridge, Wallhagen, & Cohen, 2002). In that article, the researchers advanced the perspective that what many viewed as effects of aging were, in fact, effects of disease. They proposed that individuals aging “successfully” would show little or no physiological age-related decrements, whereas those aging “usually” would show disease-associated effects of age. This model of successful aging would eventually be broadened as a result of the MacArthur Study of Successful Aging, a 10 year, \$10 million study carried out by dozens of scientists focused on developing the conceptual basis for a new gerontological model encompassing the positive aspects of aging (Rowe & Kahn, 1998). As a result of their work, two additional components were added to the model: maintenance of high physical



and cognitive functional capacity, and active engagement with life (Minkler & Fadem, 2002).

In general, much early research described successful aging in terms of length of life (Bearon, 1996). Havighurst (1961) defined successful aging as “adding life to the years,” and “getting satisfaction from life.” As further research evolved in a number of relevant fields, the definition of successful aging became more complex and comprehensive. Paltrow (1979) explains successful aging as a combination of longevity, health, and life satisfaction. Ryff (1982; 1989) proposed a model of successful aging that incorporated developmental, clinical, and mental health perspectives. She argued that an assessment of success related to aging must consider multiple aspects of life. Ryff identified six dimensions of positive functioning in her model: self-acceptance, environmental mastery, positive relations with others, autonomy, personal growth, and purpose in life.

### *Current Views of Successful Aging*

There also has been increasing consensus that, although aging is accompanied by a general decline in functional ability, there is a great deal of heterogeneity in this process (Beckett, Brock, Lemke, Mendes, Guralnik, et al. 1996; Rowe & Kahn, 1987), as was demonstrated in the Australian Longitudinal Study of Aging (Andrews, Clark, & Luszcz, 2002). Researchers in this study concluded that not only do people age with differing degrees of success, those aging most successfully not only live longer, but also report a better quality of life. This variability in the adaptation to the aging process has fueled the

search for factors and characteristics that predict the maintenance of high levels of functioning with age (Michael, et al., 1999).

Other attempts to define successful aging have used a variety of adjectives, such as, optimal aging, healthy aging, productive aging, hardiness, robust aging, and resilience. In the gerontological literature to date, there is no single, universally accepted definition or model of successful aging, or consensus regarding how best to operationalize the concept. Michael and colleagues (1999) illustrate this lack of consensus with their assertion that most research includes one or more of four different methods of conceptualizing what they term healthy aging: absence of disease or physiologic decline; high psychological function; high physical function; or some combination of the above. Strawbridge, et al. (2002) take a similar view with their observation that, with few exceptions, most definitions of successful aging are still somewhat narrow, placing a strong emphasis on health and physical functioning rather than a more inclusive conceptualization. There is also a lack of consensus as to appropriate approaches to the study of successful aging, what variables should be included in the model, and through which mechanisms is successful aging likely to be achieved.

### *Gains and Losses in Aging*

As noted above, in recent years, the deficit approach to aging has been modified and focus has shifted to characterizing the aging process as one of a changing balance between gains *and* losses, which becomes less positive with advancing age. For example, data from the MacArthur Studies of Successful Aging (Seeman, Berkman, Charpentier,

Blazer, Albert, & Tinetti, 1995), demonstrate the presence of patterns of both decline *and* improvement in physical function in old age, suggesting that old age is not inevitably associated with decline. Similarly, researchers have demonstrated that productivity often remains surprisingly high, or even improves with aging (Glass, Seeman, Herzog, Kahn, & Berkman, 1995). It appears that psychosocial factors play a role in the maintenance of productivity in old age, such as satisfaction with life, mastery, depression, self efficacy and quality of social support (Larson (1997).

More recent models of successful aging have expanded to include an ever-growing array of factors that either contribute to, or serve as barriers to its achievement. Increased attention has been focused on exploring ways of lengthening the number of years of “active life expectancy,” and increasing the quality of life during the later years (Baltes & Lang, 1997; Bearon, 1996). For example, some biomedical researchers have addressed effects of successful or optimal aging on morbidity and mortality, and have distinguished “successful” from “usual” aging (Baltes, & Baltes, 1983; Larson, 1997; Rowe & Kahn, 1987). In this frame of reference, successful agers are those individuals who are able to transcend the normal age-related changes and maintain optimal functioning until much later in life. What qualifies as optimal functioning, however, appears to be open to a wide array of interpretations throughout the literature.

### *Successful Adaptation*

Aging challenges individuals to act and respond to ever changing inner and outer environments. It has been argued that the way that people actively face and adjust to adverse circumstances is what successful aging is all about (Steverink, Lindenberg, &

Ormel; 1998). This adaptivity, or behavioral plasticity, is seen as an important criterion for achieving successful aging (Baltes & Baltes, 1990). In this conceptual framework, successful aging resides in an individual's ability to use selective optimization with compensation (SOC) successfully to adapt to the biological and psychological changes that occur with the aging process. The framework is useful in the understanding of resilience across the life span (Baltes & Carstensen, 1996; Baltes, 1997; Freund & Baltes, 1998). The process of selective optimization with compensation can be seen as a lifelong process of adaptation that involves the dynamic interplay between gains and losses, and is based upon the assumption that individuals orchestrate adaptive resources reflective of the model components (selection, optimization, and compensation) as they respond to both developmental opportunities, such as education, or limitations such as illness. As the ratio of gains and losses becomes increasingly negative a greater demand for adaptive responses to the more deleterious changes is created (Carstensen & Freund, 1994; Heckhausen, Dixon, & Baltes, 1989). As older adults encounter losses, such as those in biological, mental or social reserves, they respond by activating one or more of the model component processes – selection, optimization, or compensation (Baltes & Baltes, 1990; Carstensen & Freund, 1994; Freund & Baltes, 1998). When implemented together, use of the processes enables people to achieve their goals despite, or even because of, losses and increasing vulnerabilities associated with aging (Baltes & Carstensen, 1996).

Baltes and Carstensen (1996) contend that focusing on a reduction in reserves and an increasing number of specific losses and challenges in the biological, social, and psychological spheres on one side, and potential for growth and plasticity in old age on the other side, successful aging can best be understood. Such a model, they argue, can

accommodate a great diversity of outcomes, allow for different success criteria, and explain how people achieve successful aging in the face of simultaneous losses in multiple life domains. Thus, rather than deny the inevitable losses that face all elderly individuals in advanced age, the SOC model proposes that old age holds the potential to be a time when the accumulated knowledge and experience of a life-time can be applied to the realization of new, meaningful goals and pursuits.

### *Alternative Models*

An alternative model of successful adaptation has been suggested by Heckhausen and Schulz (1993), who extended and elaborated the SOC model by integrating it with their life-span theory of control (Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996). Their model of developmental regulation across the life course assumes that individuals are confronted with varying challenges to the maintenance of primary and secondary control throughout the life span. Primary control refers to attempts to change the world so that it meets the needs and desires of the individual. Secondary control includes attempts to bring oneself in line with the environment. Changes in biological and societal potentials and constraints over the life course alter an individual's potential for control, and successful adaptation, or balance between primary and secondary control, is dependent upon the developmental potential of the individual in the different life stages (Steverink, et al., 1998) as well as effective use of selection and compensation. The effective use of control strategies is also regulated by optimization.

Yet another model proposes that older adults experience considerable strain as they go through the aging process, and that successful outcomes are dependent upon the use of three coping strategies necessary to adapt to the changes and discontinuities of aging and maintain a positive sense of self in old age – assimilation, accommodation and immunization (Brandstädter & Greve, 1994; Brandstädter & Renner, 1990; Brandstädter, Wentura, & Greve, 1993). Assimilation and accommodation processes are used to help maintain a sense of control and positive view of self and personal development. Immunizing mechanisms influence the processing of self-relevant information so that an individual's self-descriptions are immunized against discrepant evidence (Brandstädter & Greve, (1994). Providing empirical evidence to illustrate their assumptions, Brandstädter and Greve (1994) contend that successful aging is reflected by an age-related shift from assimilative to accommodative modes of coping over the life course.

### *Research Gaps*

It has been argued that studies that have illustrated that the aging process involves losses and gains, and limits as well as potentials (Baltes & Carstensen, 1996; Scheidt, et al., 1999), help to generate questions about the meaning and significance of aging and old age. But further research is needed to develop theoretical conceptions that move beyond generalized dichotomous models of successful/unsuccessful or healthy/unhealthy aging (Minkler & Fadem, 2002). Despite considerable growth in knowledge and understanding of the aging process, there remain many questions related to successful aging. As noted previously, there is still a lack of consensus regarding the appropriate definition of successful aging and how best to operationalize the concept. Until these definitional and

operationalizing issues are resolved, empirical comparisons across studies to definitively construct appropriate explanatory models of successful aging will be hampered. Inui (2003) has argued that any attempts to describe, understand or promote successful aging must include transdisciplinary thinking that recognizes the complexity and multidimensionality of determinants of health in aging adults. In line with a transdisciplinary research approach, Inui suggests that the foundation for successful aging can be found among the various states of well-being, including biological, psychological, social, spiritual, economic, and medical. In his view, a rich template for conceptualization and measurement is necessary to identify some of what he terms “higher-order” patterns that distinguish successful aging and resilience.

### *Resilience*

#### *Defining Resilience*

Another body of research that has relevance to the study of successful aging is work exploring resilience in individuals. The term resilience has been used in a variety of perspectives and given a multitude of definitions. For example, resilience has been used to describe an older individual’s ability to cope successfully with the inevitable challenges and changes of the aging process (e.g., Brandstädter & Greve, 1994; Carstensen & Freund, 1994; Felten, 2000; Jacelon, 1997; Moen & Erickson, 1995), or the ability of some people to resist or reject the potential negative effects caused by adversity or risk factors that make people vulnerable or undermine their well-being (Bachay & Cingel, 1999). The term resilience has also has been used interchangeably with hardiness, a practice that Felton (2000) contends has obscured the conceptual meaning of

resilience. Although the terms seem somewhat similar in meaning, they convey distinctly different responses, particularly in an elderly population (Felton, 2000). Conceptually, the term hardiness is used appropriately to indicate resistance to illness or adaptation to stress (Kobasa, 1979; Selye, 1956), whereas resilience is a response demonstrating not just rebound, but also includes improvement of function following a negative circumstance (Felton, 2000).

### *Initial Resilience Research*

The initial ground work of resilience research dates back to the 1950s and 1960s, in work by Emmy Werner, Michael Rutter, and Norman Garmezy (Werner & Smith, 1977). Most of the early work related to resilience focuses on children and adolescents (e.g., Beardslee & Podorefsky, 1988; Cowen & Work, 1988; Garmezy, 1985; 1991; 1993); Masten & O'Connor, 1989; Mulholland, Watt, Philpott, & Sarlin, 1991). Researchers in childhood and adolescent development identified resilience as a factor enabling children to develop successfully into well-adjusted adults despite exposure to adverse circumstances early in life (Hardy, Concato, & Gill, 2004). Rew and colleagues (2001) concluded that homeless youth who perceived themselves as resilient, even though disconnected from other people, were less lonely, less hopeless, and engaged in fewer life-threatening behaviors.

### *Resilience and Adults*

Resilience research with adults was originally focused on outcomes, such as psychosocial function following the death of a spouse (McCrae & Costa, 1988), or on the basis of personality traits that moderate a stress response (Hardy, Concato, & Gill, 2004).



More recently, the term has been used to describe a process that incorporates certain internal traits and external factors to survive adverse circumstances or cope with stress (Richardson, 2002; Hardy, et al., 2004).

Resilience research with adults has been performed in a variety of disciplines, and has included psychological, sociological, biological, and multidimensional constructs. Studies have focused on resilience in the face of devastating illnesses, such as cancer or AIDS (Antoni & Goodkin, 1988; Rabkin, Remien, Katoff, & Williams, 1993), or have used resilience to explain individuals who appear more capable of overcoming stressful situations, negative life events, negative environments, or adjusting to traumatic losses (Aldwin, Levenson, & Spiro, III, 1994; Rutter, 1985; Solomon & Prager, 1992). Still others have looked at resilience as a protective aspect in the study of successful aging (Rutter, 1987; Wagnild & Young, 1990). Bauman et al. (2002) reviewed several studies that focused on a wide array resilience perspectives. They called attention to the fact that the research illustrates a continued lack of consistency in how the term resilience is interpreted. For example, several researchers have described resilience as a return to functional levels present prior to adverse circumstances (Rowe & Kahn 1997; Rutter 1987; Staudinger & Fleeson, 1996). Others have argued that resilience is demonstrated by improvement or growth *beyond* previous levels following adversity (Felton, 2000; Foster, 1997; LeFerriere & Hamel-Bissell, 1994; Polk, 1997; Wagnild & Young, 1990).

More recently, resilience research has been extended to include other age groups in the life span, particularly older adults (Bauman, Adams & Waldo, 2000; Brandtstädter & Greve, 1994; Felton, 2000; Hardy, et al., 2004; Jacelon, 1997; Liem, James, O'Toole, & Boudewyn, 1997; Luthar & Cicchetti, 2000; Moen & Erickson, 1995; Rabkin, Remien,

Katoff, & Williams, 1993; Wagnild & Young, 1990; 1993). Current gerontological research suggests that resiliency is a dynamic process that involves protective factors that encompass the physical, psychological, social, and spiritual domains of older adults' lives (Nakashima & Canda, 2005; Staudinger, Marsiske, & Baltes, 1995). Some researchers have argued that there is a need to move beyond focusing on decline and deterioration in the elderly and recognize potential for stability and even improvement in old age (Beckett, Brock, Lemke, Mendes, Guralnik, et al., 1996; Crimmins, Saito, & Reynolds, 1997; Strawbridge, Kaplan, Camacho, & Cohen, 1992). Responses to the challenges of the old age (illness, social isolation, physical disability, functional decline) influence the trajectory of the aging process. Those who are more vulnerable to these challenges, who decline or die, are conceptually different from those who are able to resist the challenges and maintain stable health and function, or even succumb temporarily but then recover (Walter-Ginzburg, Shmotkin, Blumstein, & Shorek, 2005). This resistance to the forces of decline and deterioration, or stability in the face of stresses and challenges can offset losses. Taken together, stability and improvement define resilience (Brandstädter & Greve, 1994; Gelten, 2000; Walter-Ginzburg, et al., 2005).

Regardless of which definition is referenced, it appears that many of them encompass common themes: Resilience surfaces in the face of hardship and involves the way in which individuals respond to challenges; individuals exhibiting resilience are able to bounce back or rebound from adversity, reaching or surpassing a pre-crisis level of functioning; and resilience is often described in terms of wellness or strengths, rather than pathology or deficits (Hawley, 2000; Hawley & DeHann, 1996).

### *Protective Factors Related to Resilience*

Resilience is often discussed in terms of protective factors that may serve as resources to buffer the effects of challenges or adversity (Hawley, 2000). Resilience is more likely to be present in situations where factors are minimized by the presence of protective factors (Hawley, 2000). Protective factors might include dispositional characteristics or temperament (Pitkala, Laakkonen, Strandberg, & Tilvis, 2004; Siegler & Brummett, 2000), social resources (Holahan & Holahan, 1987), or religiosity (Martin, 2002). Some researchers have integrated resilience as a construct in their conceptual framework, and argue that it represents: (a) stress and risk mechanisms, (b) coping and protective mechanisms, or (c) buffers or moderating mechanisms (Egeland, Carlson, & Sroufe, 1993; Rew, et al., 2001; Rutter, 1987). Rutter (1987) contends that people are able to adapt and cope with adversity or negative events as long as they are able to balance risks, stressful life events, and protective factors adequately. Considering the heterogeneity of the aging population, it is likely that protective factors vary among individuals. Werner (1990) suggests that the concepts of resilience and protective factors are the obverse of vulnerability and risk factors. Other researchers have asserted that two sets of protective factors promote resilience when confronted with challenges, social resources and personal resources (Moen & Erickson, 1995; Rutter, 1987; Schaefer & Moos, 1992). The identification of specific factors that offer a protective influence against risk factors associated with aging could assist in the development of interventions aimed at increasing resilience in the elderly. As with other areas of resilience research, there is a common focus on the multidimensionality of the conceptual framework. Sperry (1992) defines resilience as a multidimensional construct encompassing emotional,

spiritual, social, cognitive, and physical domains. Bauman and colleagues (2001) concur with Sperry's view that these domains are interdependent, and thus suggest that they should not be considered in isolation. Rather, resilience should be explored as a holistic construct.

### *Resilient Adults*

Resilient individuals are more likely to possess some combination of internal (e.g., personality or dispositional characteristics) and external (e.g., social support) resources which to draw when faced with adversity (Wallace, Bisconti, & Bergeman, 2001). Resilient elders tend to maintain a positive sense of well-being in the face of loss of spouse and friends, loss of physical function, and decline of social status that are commonly a part of the aging process (Bauman, et al., 2001; Carstensen & Freund, 1994), and are better able to recover from the impact of difficult circumstances, such as difficult transitions or crises (Bauman, et al 2001). Resilient individuals have also been described as exhibiting social and psychological competence characterized by five major themes: (1) equanimity, or having a balanced perspective of one's life experience; (2) perseverance, or being able to carry on in spite of adversity, and a willingness to continue the struggle; (3) self-reliance, or a belief in oneself and one's abilities; (4) meaningfulness, or the realization that life has a purpose, and that one can contribute meaningfully; (5) existential aloneness, or the realization that the path that each individual takes is unique (Wagnild & Young, 1993).

In the oldest old, resilience has been measured as a return to previous levels of functioning post adversity, and some researchers have suggested that such a process may

actually lead to growth and improved functioning (Bauman et. al., 2002; Dyer & McGuinness, 1996; LaFerriere & Hamel-Bissell, 1994). This distinction is important in conjunction with older adults, because their ability not *only* to rebound but improve in function after a devastating illness, is a critical characteristic if they are to continue to live independently (Felton, 2000).

How individuals are able to cope with stressful experiences is often determined by the availability of individual and social resources (Krause, 1997; Martin, 2002). A stable repertoire of resources can help individuals to compensate for the losses and adjustments that accompany the aging process (Martin, 2002; Steverink, Westerhof, Bode, & Dittmann-Kohli, 2001). For example, dispositional factors that underlie resiliency in aging adults may enhance their ability to cope with adversity. Identifying these factors may assist service providers in predicting which adults are at greatest risk of succumbing to negative circumstances and which adults have the potential to resist prolonged negative consequences of adversity successfully (Jacelon, 1997). This understanding will enable professionals to identify which adults could benefit from encouragement to use their skills to persevere, and which adults should be assisted in the development of skills to help them negotiate the effects of variations in health (Jacelon, 1997). Resilience assessment also will improve clinicians' ability to better predict which older adults will be able to return to previous functional levels successfully following acute illness or adverse situation and which individuals may benefit from more customized intervention (Hardy, Concato, & Gill, 2004).

### *Reserve Resources and Resilience Outcomes*

It has been suggested that the most optimal outcomes are achieved through a combination of protective factors working together (Wallace, et. al., 2001). For example, individual resources work in tandem with various family/community support factors, such as social support, to provide protective effects or resilience outcomes in older adults (Bergeman & Wallace, 1999; Garmezy, 1985; Rutter, 1987; Wallace, et. al., 2001).

Resilience mechanisms appear to serve as important potential reserve resources that can be drawn upon to compensate for increased losses and change associated with aging (Wallace, et al. 2001). Wallace and colleagues have argued that this relationship is consistent with life-span developmental perspective. They contend that the possibility that more optimal outcomes result from the interplay between resilience resources, is in line with the conceptual notion of intra-individual plasticity, or within-person variability, in development. The researchers note that whereas these resources do not protect an individual from loss or decline, they do enhance ability to maintain, regain, or advance beyond the level of functioning that precedes adverse experiences. Thus, these resilience resources could be described as “latent reserves” on which an individual may draw when faced with adversity.

### *Purpose of Study*

Building upon previous research that has suggested an association between religious involvement and a number of resilience factors associated with successful aging in elderly adults, this study explored the extent to which religiosity predicts subjective well-being in a population of elderly adults residing in an age-segregated retirement

community in Florida. Additionally, the study investigated the possibility that the relationship between religious involvement and subjective well-being in elderly adults is mediated by optimism, a factor that has been linked similarly to more positive outcomes in elderly adults.

### *Dependent Variables – Subjective Well-being*

#### *Identifying and Predicting Subjective Well-being*

Conceptually, the dependent variables in this study are constructs that have been used to represent markers of resilience and successful aging as suggested in the literature, and are operationalized as measures of subjective well-being. The variables, life satisfaction and depressive symptomatology, were chosen to represent a bidimensional measurement of subjective well-being. The independent variable, religiosity, was measured with an index that included several aspects of religious involvement suggested by other researchers as important elements in the association between religion and positive outcomes in individuals. Optimism, the proposed mediating variable, was chosen based on accumulating evidence that suggests that positive life orientation, or optimism, predicts favorable outcomes after controlling for possible confounders (Chang & Sanna, 2001; Pitkala, Laakonen, Strandberg, & Tilvis, 2004) and its proposed relationship to activity and social interactions (Pitkala, et al., 2004).

#### *Subjective Well-being*

Subjective well-being (SWB) is generally used to refer to how people evaluate their lives, and may include such variables as life satisfaction, lack of depression and anxiety and positive moods and emotions (Diener & Emmons, 1984; Pavot & Diener,

1993). For example, a person might be said to have high (SWB) if he or she experiences life satisfaction, frequently experiences positive emotions and infrequently experiences debilitating sadness or depression. Because subjective well-being is one of the major outcome variables in the field of aging, there are a number of measures available (e.g., Bradburn, 1969; Lawton, 1975; Neugarten, Havighurst, & Tobin, 1961; Watson, Clark, & Tellegen, 1988). Subjective well-being also has been found to be correlated with optimism (Scheier & Carver, 1985), self-esteem (Wilson, 1967), and control beliefs (Lachman & Weaver, 1998). Individuals with more positive self-illusions, including unrealistically positive self-perceptions or overly optimistic views of the future, not only have higher SWB but other qualities such as caring for others and the ability to engage in productive work (Taylor & Brown, 1988). These positive illusions and higher SWB, in turn, are correlated with successful adjustment to stressful circumstances, including extreme adversity (Taylor & Armor, 1996). High SWB has been used to imply a happy life with many pleasant, and few unpleasant, experiences and high life satisfaction (Schimmack, Oishi, Furr, & Funder, 2004). For this study, subjective well-being was operationalized as a bidimensional construct and measured with scales representing life satisfaction and depressive symptomatology.

### *Life Satisfaction*

Moods and emotions, labeled affect, represent people's evaluations of the events that occur in their lives (Diener, et al., 1999). Life satisfaction forms a separate factor from the two major types of affect (PA/NA) (Andrews & Withey, 1976; Lucas, Diener, & Suh, 1996). Life satisfaction refers to the conscious, cognitively judgmental process



individuals use to assess the quality of their lives in accordance with their own unique set of criteria (Shin & Johnson, 1978). Diener and colleagues (1985) argue that, because individuals tend to assign different standards of success to different domains of their lives, it is necessary to assess an individual's global judgment of his or her life, rather than focusing solely on satisfaction with specific domains.

### *Depressive Symptomatology*

Depression is a common and often serious clinical condition that is especially prevalent in older individuals with acute and chronic medical conditions (Feinson, 1985; Lewinsohn, Seeley, Roberts, & Allen, 1997; Waxman, Carner, & Klein, 1984). Community-based epidemiologic studies have shown an association between depressive symptoms and mortality (Zheng, Macera, Croft, Giles, Davis, & Scott, 1997), cognitive deficits such as disturbances in thinking, problem solving and self-efficacy, and diminished adaptive skills in the face of illness (Covinsky, Kahana, Chin, Palmer, Fortinsky, & Landefeld, 1999). Depression also has been associated with feelings of hopelessness, low self-esteem and sadness, decreased activity that may contribute to functional loss, and decreased ability to marshal social support and assistance (Covinsky, et al., 1999). These processes, in turn, may accelerate functional decline and prevent older adults from successfully negotiating challenges associated with chronic illness (Bruce, Seeman, Merrill, & Blazer, 1994) or declines associated with the aging process. Depressive symptomatology might also indicate a loss of sense of meaning in life (Rothermund & Brandstadter, 2003). From a resilience perspective, however, older adults may be able to activate other resources to maximize the quality and quantity of

one's life (M. M. Baltes & Lang, 1997), thus reducing the effects of depression. Resources such as religion (Ellison, 1994) and life orientations (Brandtstadter & Rothermund, 2002) may help aging individuals to derive meaning from other domains of life.

### *Independent Variables*

#### *Resilience and Proactive Behaviors*

To understand the aging process more completely, it is critical to recognize that aging takes place in a social context (Albert, Im, & Raveis, 2002). Findings from recent gerontological research illustrate that social and psychological environments play important roles in disability in old age. For example, older people who experience physical and cognitive impairments often alter their environments in ways that enable them to prolong their independence (Albert, et al., 2002). Thus, when studying older adults, it is important to identify psychological, social, and environmental characteristics or behaviors that promote resiliency or enhance adjustment to facilitate survival into later ages.

Sociological views of successful aging emphasize proactive skills such as coping with stress and loss, the ability to reframe negative life experiences, and social interaction as means of achieving successful adaptation to the aging process (Ford, et al., 2000). Kahana and colleagues (1996; 2002; 2003) propose a model that features prosocial activities as mediators or moderators to stressful situations to demonstrate successful adaptation in the elderly. Their multi-factorial model, titled Proactive Options for Successful Aging (Kahana, et al., 2002), places an emphasis on proactive/preventive

behaviors (e. g., health promotion, planning, helping others) and corrective adaptations (e. g., marshalling support, role substitution, environmental modification) as means to cope with challenges and losses associated with aging, as well as focuses on social interactions as factors which help older adults achieve successful aging. In this context, proactive behaviors act to forestall or delay the emergence of stressors common to late life, such as chronic illnesses, and successful aging is characterized as positive affective states, a sense of meaning in life, and maintenance of valued activities and relationships. In the current study, prosocial behavior was operationalized as religiosity. To reduce the possibility of spurious associations created by the influence of certain dispositional characteristics on religiosity, positive and negative affect, each likely to be correlated with the independent variable, were included in the model as covariates.

Proactive behaviors, including leisure, religious and productive activities often take place within the context of social relationships. Numerous studies have demonstrated associations between interpersonal relationships and lower mortality and improved subjective health and well-being (Berkman & Syme, 1979; Blazer, 1982; House, Robbins, & Metzner, 1982; Orth-Gomér, Rosengren, & Wilhelmsen, 1993; Seeman, Kaplan, Knudsen, Cohen, & Guralnik, 1987; Vogt, Mullooly, Ernst, Pope, & Hollis, 1992). Religious activities are likely to produce interpersonal relationships and increase the range of informal social resources available to older adults (Midlarsky & Kahana, 1994; Pearlin, 2001; Rosenberg & McCullough, 1981). Research has suggested that older adults who have a greater degree of social involvement generally tend to have lower mortality rates than those who are less involved (Seeman, et al., 1987). However, social interactions often take place in the context of other types of activities, such as

religious participation. As a result, it has frequently been difficult for researchers to sort out the causal path of variables, that is, to distinguish which benefits are conveyed by the social aspect, and which derive from the actual content of the activities (Lennartsson & Silverstein, 2001). It is also possible that the selection hypothesis might provide explanations for a number of associations between activities and such positive outcomes as reduced mortality and enhanced health. In other words, it may be the case that those adults who have better health and are more active to begin with are the ones that are experiencing reduced mortality and enhanced health, regardless of their participation in these activities.

### *Religiosity*

#### *Prevalence of Religious Behavior and Affiliation*

Religiosity and spirituality are distinctly different constructs that constitute integral forces in the lives of many individuals. It is estimated that as many as 90% of American adults report some manner of formal religious affiliation (Kosmin & Lachman, 1993). Gallup (1995) polls indicate that nearly 96% of Americans believe in God or a universal spirit, 42% report regular worship service attendance, 60% indicate that religion is “very important” to them (McCullough, Larson, Hoyt, Koenig, & Thoresen, 2000), and approximately 88% report that they pray to God (Hoge, 1996). There is a substantial literature that connects religion and spirituality to physical health (Hill & Pargament, 2003; Powell, Shahabi, & Thoresen, 2003; Seeman, Dubin, & Seeman, 2003; Thoresen, 1999) and mental health and well-being (e.g. Donahue, 1985; Krause, 1992; Idler, 1987). Studies from a number of disciplines generally have found a salutary relationship

between religious involvement and a broad range of health outcomes (Chatters, 2000; Ellison, 1991; Idler, 1987; Levin & Vanderpool, 1989; Musick, 1996; Oman & Reed, 1998), as well as lower mortality (Hummer, Rogers, Nam, & Ellison, 1999; Kark, Shemi, Friedlander, Martin, Manor, & Blondheim, 1996; McCullough, et al., 2000; Oxman, Freeman, & Manheimer, 1995; Strawbridge, Cohen, Shema, & Kaplan, 1997). Moreover, many Americans report believing that there is a connection between religion and health, with 79% reporting their belief that God answers prayers for healing from incurable diseases (Woodward, 1997), and 25% reporting that they pray regularly to be healed from illness ( Eisenberg, Kessler, Foster, Norlock, Calkins, & Delbanco, 1993). Levin (1994) reviewed over 200 published empirical reports from medicine and epidemiology, and reported the existence of statistically significant linkages between religion and such health conditions as, cardiovascular disease, stroke, hypertension, cancer, as well as self-rated health. Those who attend religious services more often have been shown to be less likely to be admitted to the hospital, have fewer admissions overall, and spend fewer days there than those with less religious affiliation (Koenig & Larson, 1998). However, there also have been contradictory results produced by researchers who found no association between religious coping and hospital use (Koenig, 1995; Levin & Markides, 1985).

### *Religion and Well-being*

Religiosity, as an individual resource, can be defined as personal beliefs and behaviors that express a sense of relatedness to something greater than the self (Wilkinson & Lynn, 2001). Religious involvement has been related to better physical

functioning, subjective appraisal of health, life satisfaction, well-being, and personal adjustment (Neill & Kahn, 1999). Studies demonstrating the positive relationship between religiosity and an array of indicators of well-being in older adults date back to the 1940's (Campbell, 1975; Hunsberger, 1985; Idler, Musick, Ellison, George, Krause, et al., 2003; Koenig, Kvale, & Ferrel, 1988; Krause, 1998; Larson, 1978; McFadden, 1995; Moberg, 1990; Okun & Stock, 1987). More religious individuals may be able to draw on beliefs and traditions of their faith to allay fear, gain hope, or put events into perspective (Hadaway & Roof, 1978; Idler, et al., 2003; Reker, Peacock, & Wong, 1987). When faced with physical declines associated with aging, religious beliefs may be an important source of hope and comfort, and may help aging adults to cope with stress, disability and the losses of loved ones (Koenig, George & Siegler, 1988). Religiously oriented individuals may find more meaning or purpose in life (Musick, Traphagan, Koenig, and Larson, 2000), which in turn impacts their attitude, activities and well-being (McFadden, 1995). Elder adults may experience numerous difficulties such as ill-health, reduction of income, and a shrinking social network but still retain a sense of well-being and the conviction that life has meaning. In some elder adults, this demonstration of resilience may be linked with religious commitments that not only affect subjective assessments of well-being, but may also influence objective indicators such as health and social support (Dull & Skokan, 1995; George & Clipp, 1991; McFadden, 1995).

Research has demonstrated that among older adults, religious beliefs and practices are associated with higher self-esteem and feelings of self worth (Krause, 1995), and that those who reporting a strong religious faith describe themselves as happier and more satisfied with their lives (Ellison, 1991). Religious coping strategies appear to offer

particular protective effects, especially in situations of bereavement or serious illness, over which an individual may have little direct control (Mattlin, Wetherington, & Kessler, 1990). Such situations are common challenges faced by elderly individuals. Religious belief systems offer resources for understanding tragic or stressful events and often can enable individuals to come to terms with such situations and enhance their ability to find acceptance and peace (Ellison, 1991; Idler, et al., 2003).

There appears to be little consensus in the research as to which specific dimensions of religiosity account for the associations with well-being. The literature indicates that religion may enhance various dimensions of well-being in at least four ways: 1) through social support and integration; 2) through the establishment of personal relationships with a divine other; 3) through the provision of systems of meaning and existential coherence; and 4) through the promotion of more specific patterns of religious organization and personal lifestyle (Ellison, 1991).

#### *Age Effects on Religious Involvement*

Although levels of religious attendance may decrease, levels of religiosity among individuals tend to increase as they age (Blazer & Palmore, 1976). Empirical data indicate that religion remains an important factor in the lives of elderly adults (Commerford & Reznikoff, 1996). Older people often turn to religion as a means of coping with stressful events or crises (Koenig, George, & Siegler, 1988; McCrae, 1984). Coping strategies might include praying, seeking spiritual support and guidance, or seeking social support from the religious community (Pargament, Ensing, Falgout, Olsen, Reilly, et al., 1990).

Not all studies, however, have demonstrated conclusive evidence for the salutary relationship between higher levels of religious involvement and positive outcomes (Benjamins, 2004; Markides, Levin, & Ray, 1987). For example, Markides, et al. (1987) found that when dropouts from successive waves of an 8-year study were excluded from analyses, the relationship between religious attendance and life satisfaction disappeared. Additionally, Benjamins (2004) calls attention to gaps in the research. She notes that only a small number of studies have concentrated on functional limitations. A large proportion of elderly adults are challenged by functional limitations, and these limitations often prevent the performance of everyday activities, reduce mobility, and can lead to a loss of independence. The studies that have addressed the influence of religious factors on functional limitations have produced conflicting results as to the association between the two variables (Idler & Kasl, 1992; 1997; Krause, 1998), with one set of studies finding that religious attendance predicts higher levels of physical functioning, and the other finding no association between religious variables and functional disability.

#### *Possible Mechanisms of Religion's Influence*

Religion serves as both a social institution and a source of existential meaning to individuals, and as such, is an important personal resource for older adults in terms of the provision of services and fellowship and assistance with coping and adaptation with issues of daily life, change, loss and death (Levin, 1994). Epidemiological findings have demonstrated that as adults age religious involvement becomes more strongly predictive of better health, happiness and life satisfaction. Levin (1994) notes that more private expressions of religiosity and positive subjective religious attitudes also tend to promote



health, especially when factors such as declining health, restrict more formal and public participation. McFadden (1995) similarly suggests that more solitary religious activities, such as prayer and meditation may produce positive effects, such as emotional calm.

Hypotheses proposed to explain the mechanisms through which religion influences health include, the health promoting behaviors advocated by some religions (Cochran, Beeghley, & Bock, 1994; Ellison, 1994) the social support available in religious communities (Ellison, 1991), the subjective perceptions of well-being effectuated by religious beliefs (Levin 1994a, 1994b), and the emotional comfort created by religious ritual (Levin, 1994a, 1994b). These hypotheses have been applied to studies of both physical and mental well-being (McFadden, 1995). Some research has indicated that religion is the coping resource most frequently cited by older adults (Koenig, George, & Siegler, 1988) and suggests that religion's stress buffering properties affect how older adults experience both physical illness and mental distress, perhaps by compensating for the erosion of feelings of mastery and self-esteem produced by stress (Krause & Tran, 1989). Ellison (1994) also suggests that religion plays a significant role in the stress paradigm, serving to impede depression by reducing the risk of certain major stressors, generating relatively high levels of objective and subjective social resources, and enhancing positive self-perceptions and other psychological resources. Thus, since older age may bring about more challenges and shrinking of resources, the resulting higher levels of stress may increase the influence that religion may have on health (Krause & Tran, 1989)

Many researchers have suggested that positive aspects of religion may be experienced as a result of religious philosophy or teachings in that many health

promoting or health threatening behaviors may be prescribed or proscribed by particular religions or religious denominations (Ellison, 1991; Gardner & Lyon, 1982; Idler, 1987; Levin, 1994a, 1994b; Levin & Vanderpool, 1989). Additionally, religious individuals may have religioethical norms that guide their behaviors (Ellison & Levin, 1998). These governances may lead individuals to abstain from unhealthy behaviors such as smoking tobacco, eating red meat or drinking alcohol, and as a result, may help to lower morbidity and mortality rates among certain religious groups (Cochran, Beeghley, & Bock, 1988; Gottlieb & Green, 1994).

Regardless of the hypothesis being explored, it has been argued that when exploring explanatory mechanisms of religious influence on health outcomes, it is necessary to control for the effects of behavioral traits on outcomes to avoid spurious relationships (Benjamins, 2004). Other researchers have cautioned that age, ethnicity, gender, education, disability, and poor health should be treated as confounders because of their relationship to both religion or spirituality and health and well-being outcomes (Ainlay, Royce, & Swigert, 1992; Ferraro & Koch, 1994; Levin, Taylor, & Chatters, 1994).

#### *Negative Effects of Religion on Health and Well-being*

Religion is a complex system of beliefs and teachings that can heavily influence attitudes and behaviors. For example, religion may play a role in how people judge and compare themselves, or be a key in defining which qualities and beliefs are important. These thoughts and comparisons could either result in a view that defines oneself in a positive, self-efficacious context or a negative, powerless one (Dull & Skokan, 1995).

Such views can affect feelings of empowerment, optimism, and self-esteem, (Pargament, et al., 1990), and in turn, influence health and well-being. Religion may reduce feelings of control and create increased stress in individuals who strive to conform to religious doctrine and authority (Dull & Skodan). Also, not all individuals gain a sense of hope and optimism from religious beliefs (Dull & Skokan, 1995). Religious beliefs may play a role in whether people view current events or challenges with optimism or fatalistic pessimism. Such hopelessness and pessimism can debilitate self-esteem and self-enhancing actions (Peterson, Seligman, & Vaillant, 1988).

#### *Causal Considerations and Alternative Explanations*

The above results should be interpreted with caution (Crowther, Parker, Achenbaum, Larimore, & Koenig, 2002). It has been argued that such findings may not produce conclusive results because religiously committed individuals may be less likely to engage in behaviors that pose threats to health, such as cigarette smoking and excessive alcohol use. They are also frequently involved in close family systems and supportive communities that may actually account for the causal mechanisms in the religion and health association (Crowther, et al., 2002).

An alternative explanation for religion's positive effects on well-being might lie in sense of belonging, fellowship and support that religious involvement often entails. As noted previously, there is ample evidence in the literature that demonstrates the salutary nature of social relationships (Levin, 1994a, 1994b). Ellison (1994) contends that individuals who are embedded in religious communities may enjoy larger and denser social networks than nonreligious individuals. Church contacts can create opportunities

for individuals to become integrated into wider, more diffuse networks that reach beyond the confines of their congregation (McIntosh & Alston, 1982). Churchgoers may receive more social support and may perceive their support networks to be more reliable and more supportive than their non-religiously-oriented counterparts (Ellison, 1994; Ortega, Crutchfield, & Rushing, 1993). This support may include companionship, provision of a confidant, instrumental aid, informational assistance, bereavement support, pastoral counseling, visitation, etc. (Ellison, 1994; Eng, Hatch, & Callan, 1985; Haber, 1984; Ortega, et al., 1993).

### *Measuring Religious Involvement*

Religious attendance is frequently seen as an indicator of organized religious activity and is one of the most widely used religion measures (Benjamins, 2004).

Religious attendance is associated with a wide range of both physical and mental health outcomes, such as, well-being, self-rated health, hope, optimism, purpose, self-esteem, coping and depression. It is positively associated with a wide range of physical and mental health outcomes, despite the inclusion of extensive controls (Benjamins, 2004; Chatters, 2000; Ellison, 1991; Musick, Traphagen, Koenig, & Larson, 2000), and negatively associated with mortality (Hummer, Rogers, Nam, & Ellison, 1999; Strawbridge, Cohen, Shema, & Kaplan, 1997).

Religious salience, a measure of private religious involvement, beliefs and attitudes, is associated with a wide range of mental and physical health outcomes such as reduced levels of depression and higher levels of well-being (Benjamins, 2004). Salience may be reflected in measures of how frequently one prays or how important one

considers their own religion. For example, adults with high levels of religious commitment, specified as incorporating both religious meaning and religious belonging, report significantly more satisfaction with their lives than persons with lower levels of commitment (Hadaway & Roof, 1978). Additionally, it has been found that the importance attached to religious faith, or religious meaning, is a stronger predictor of life satisfaction than subjects' marital status or reported number of friends. Religious salience also appears to have a positive effect upon meaning and purpose in life, even after controlling for age, education, race, marital status, perceived health, church attendance and other religiosity variables (Petersen & Roy, 1985).

Inconsistency of findings across studies of the relationship between religion and health has been fueled by the absence of adequate measures of religiosity and spirituality (Idler, Musick, Ellison, George, Krause, et. al., 2003; Krause, 1993; Levin & Vanderpool, 1987). This inconsistency suggests that careful attention should be given to the choice of variables used to measure religiosity to reduce spuriousness of findings and enhance generalizability.

### *Multidimensionality of Religious Involvement*

Social scientists have long recognized the multidimensionality of religiosity, but such conceptual insights have been slow in being implemented in empirical studies with older populations (Krause, 1993). There have been recent advances in the conceptualization of religiosity constructs and their measurement (for a review see Hill & Pargament, 2003; Idler, et. al., 2003; Powell, et. al., 2003). Some researchers contend that, in order to tap the complexity of the construct of religiosity, one must address a

number of domains that reflect a wide variety of behavioral aspects, such as attendance at worship services, solitary prayer, meditation, reading of sacred texts, as well as attitudinal aspects such as beliefs, values, and feelings (Glock & Stark, 1965; Krause, 1993; Idler, et. al., 2003). Failure to examine a wide set of dimensions of religiousness and spirituality and when exploring their relationship to health and well-being may result in vague, inconclusive or spurious results.

### *Mediating Variable*

#### *Dispositional Optimism*

There is accumulating evidence that suggests that dispositional optimism is beneficial for physical and psychological well-being (Scheier, Carver, & Bridges, 1994). Dispositional optimism refers to an individual's perceptions of situations and expectations of favorable or positive outcomes over time (Brenes, Rapp, Rejeski, & Miller, 2002; Scheier & Carver, 1985). Conversely, pessimists are individuals who generally have a more negative outlook on life and expect that things will go badly (Scheier & Carver, 1985). Positive emotions serve as markers of optimal well-being (Fredrickson, 2001), and optimistic orientations to the future have been identified as important hallmarks of successful aging (Birren & Renner, 1980). Previous studies have demonstrated that dispositional optimism is associated with both physical and psychological outcomes, including health symptoms, depressive symptomatology and surgery recovery (Brenes, Rapp, Rejeski, & Miller, 2002; Peterson, 2000; Scheier & Carver, 1992). Pessimism has been associated with anxiety, stress, self-rated health (Robinson-Whelen, Kim, MacCallum, & Kiecolt-Glaser, 1997), and depression (Bromberger & Matthews, 1996). Researchers have found that persons with a more

positive life orientation tend to consider their health better than others, have significantly less clinical depression among them, are healthier at baseline, have higher levels of functioning than the rest of the sample, and have more favorable outcomes (Pitkala, Laakkonen, Strandberg, & Tilvis, 2004).

Individuals who believe that their actions will lead to favorable outcomes presumably will continue to put forth effort toward their aims and goals in life, whereas those who believe that failure is inevitable tend to give up their efforts and disengage from the pursuit of their goals (Lucas, Diener, & Suh, 1996). Optimistic individuals have been shown to adjust more favorably to life transitions than do those persons who hold a more pessimistic life outlook (Aspinwall & Taylor, 1992). Optimists appear to differ from those more pessimistically oriented in that they seem to possess more stable coping tendencies (Carver, Scheier, & Weintraub, 1989), display fewer depressive symptoms (Chang, Maydeu-Olivares, & D’Zurilla, 1997), and differ in the manner in which they cope with serious health threats or disease (Carver, Pozo, Harris, Noriega, Scheier, et al., 1993; Friedman, Nelson, Baer, Lane, Smith, & Dworkin, 1992; Taylor, Kemeny, Aspinwall, Schneider, Rodriguez, & Herbert, 1992). Those with a more pessimistic attitude may seek treatment less often, may be less compliant with treatment regimens, may be less physically active, and may utilize less adaptive strategies for coping with pain, all of which might lead to poorer physical outcomes (Brenes, et al., 2002). Conversely, it has been theorized that optimists are more likely to participate in healthy behaviors and pursue more health-related goals (McNicholas, 2002; Scheier & Carver, 1985).

### *Optimism as an Explanatory Factor in Resilience Outcomes*

The ability to remain optimistic even in when faced with difficult circumstances, such as the deterioration associated with aging or illness, may represent a reserve resource important to resilient outcomes (Taylor, Kemeny, Aspinwall, Schneider, Rodriguez, & Herbert, 1992; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). Positive emotions may actually lead individuals to become more resilient to adversity over time (Fredrickson, 2001). There is evidence that optimism along with high self-esteem and perceptions of personal control predict better post-stressor adjustment and serve as core resources that contribute to a resilient personality (Aspinwall & Taylor, 1992; Carver, Pozo, Harris, Noriega, Scheier, et. al., 1993; Major, Richards, Cooper, Cozzarelli, & Zubek, 1998). Other researchers have found that optimism is associated with engaging in social relationships (Jylhä & Aro, 1989; Olsen, Olsen, Gunner-Svensson, & Waldstrom, 1991), although the direction of the associations, are less clear. It is possible that people who are more optimistic or hopeful about their future are more likely to engage in social interactions as well as other activities such as volunteerism, religious activities, and health promotion. Alternatively, social integration may predict optimistic orientation (Symister & Friend, 2003). It is also quite likely that the associations are actually bidirectional, or are mediated by other factors, such as self-esteem. Regardless of the causal direction of associations, it is posited that optimism or hopefulness will impact respondent behavior and outcomes.

Optimism also has been conceptualized in research as positive life orientation. Positive life orientation has been shown to be protective against mortality and permanent institutional care in the elderly (Pitkala, et al., 2004). Persons with a positive outlook on



life consider their health better than others, are less clinically depressed (Ostir, Markides, Black, & Goodwin, 2000; Pitkala, et al., 2004), and engage more in social relationships, which have a protective effect against adverse health outcomes (Olsen, Olsen, Gunner-Svensson, & Waldstrom, 1991).

### *Control Variables*

Age (Field & Minkler, 1988; Fung, Carstensen, & Lang, 2001; Lee & Markides, 1990), gender, education (Feldman, Makuc, Kleinman, & Cornoni-Huntley, 1989; Haan, Kaplan, & Comacho, 1989; House, Kessler, & Herzog, 1990; Marmot, Kogevinas, & Elston, 1987; Ulbrich & Warheit, 1989), and marital status (Bisschop, et al., 2004; Bosworth & Schaie, 1997; Ross & Mirowsky, 1989) or whether or not the respondent lives alone are associated with resilience and successful aging outcomes (Berkman, Seeman, Albert, Blazer, Kahn, et al., 1993; Kahana, et al., 2002; Strawbridge, Cohen, Shema, & Kaplan, 1996). These demographic influences represent relatively immutable influences in a successful aging paradigm. Income or assets, representing financial and environmental resources, are among the most widely studied predictors of late-life well-being (Larsen, 1978). Income is associated with a number of positive outcomes including successful aging (Aneshensel, 2002; Baltes & Lang, 1997). Elderly adults with higher socioeconomic status tend to join more organizations, volunteer more and demonstrate greater social integration, all of which have been associated with successful aging and enhanced wellbeing (Thoits & Hewitt, 2001; Wilson, 2000). Elderly adults with lower income may experience greater exposure to health threats such as unsafe environmental conditions, poor housing, inadequate nutrition (Robert & House, 1996), higher levels of stress and depression, and limited access to resources and assets that

might otherwise offset the adverse impact of these stressors (Aneshensel, 1992). Lower income adults also may have greater need of social support, and experience greater adversity when they do not receive adequate social support (Unger, McAvay, Bruce, Berkman, & Seeman, 1999). Conversely, elderly adults with higher income are able to afford health care, assistive devices, better nutrition, transportation, and entertainment. Adequate income also allows them the opportunity to pay others for assistance with household tasks (Unger, et al., 1999). The ability to pay for appropriate housing, household assistance, or travel to visit with friends and relatives may enable higher income elderly to compensate for a lack of social support (Unger, et. al., 1999) or substitute for activities they give up as aging creates barriers to participation (e. g., religious attendance).

### *Covariates*

#### *Health Self Appraisal*

Previous research has shown correlations between health self-appraisal (subjective health) and both physical and psychological well-being (Bosworth & Schaie, 1997). Many studies have demonstrated that, in older adults, self-ratings of health are significantly shaped by objective health conditions (e.g., Fillenbaum, 1979; Maddox, 1962; Tissue, 1972), and are frequently similar to those performed by physicians (LaRue, Bank, Jarvik, and Hetland, 1979; Suchman, Phillips, & Streib, 1958). Global self-evaluations of health have thus proven to be effective predictors of morbidity and mortality that reflect substantial stability through time (Gold, Franks, & Erickson, 1996; Idler & Kasl, 1991; Idler, Kasl, & Lemke, 1990; Kaplan & Camacho, 1983; Maddox &

Douglas, 1973; Schoenfeld, Malmrose, Blazer, Gold, & Seeman, 1994; Wolinsky & Johnson, 1992). Although previous works have frequently differed in how health self-appraisals have been measured, the consistency of effects indicate the importance of including this construct in studies seeking to predict physical or psychological well-being. .

### *Positive and Negative Affect*

Temperament has a strong influence on subjective well-being. Studies on twins separated at birth have demonstrated that both pleasant and unpleasant affect have a strong genetic basis (Tellegen, Lykken, Bouchard, Wilcox, Segal, & Rich, 1988). Numerous studies demonstrate that negative emotions, such as depression and feelings of loneliness, are significant predictors of declining health and reduced survival in old age (Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000; Kivela, & Pahkala, 2001; Penninx, Guralnik, Ferrucci, Simonsick, Deeg, & Wallage, 1998; Tilvis, Pitkala, Jolkkonen, & Strandberg, 2000). Recent studies demonstrate that mood serves as an important factor in psychological adjustment (Chang & Sanna, 2001). Most importantly, findings indicate that such psychological adjustment measures as depression and life satisfaction are strongly associated with both negative and positive affect (Chang, Maydeu-Olivares, & D’Zurilla, 1997).

Mood is composed of two distinguishable dimensions, identified as positive affect (PA) and negative affect (NA) (Watson, Clark, & Tellegen, 1988). Positive affect and negative affect are generally considered to represent the emotional components of subjective well-being (Hillerås, Jorm, Herlitz, & Winblad, 1998). Generally, PA is

strongly related to extroversion (but not neuroticism) and NA is substantially correlated with neuroticism (but not extroversion) (Diener, 1984; Hillerås, et al., 1998). Positive affectivity represents the extent to which individuals generally feel active, alert, and enthusiastic. High PA is characterized by high energy, full concentration, and pleasurable engagement. Low PA is characterized by sadness and lethargy. Positive affect has been linked to positive physiological changes (Futterman, Kemeny, Shapiro, & Fahey, 1994), better social relationships (Taylor & Brown, 1988), and the practice of more conscientious health habits and appropriate use of healthcare services (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). Positive affect is inversely correlated with health and environmental factors such as physical disability, cognitive problems, negative life events, and minimal social contacts (Pitkala, Laakkonen, Strandberg, & Tilvis, 2004).

Conversely, negative affectivity (NA) reflects a general dimension of subjective distress and unpleasant engagement, and reflects the extent to which an individual feels guilt, anger and fear (Hillerås, et al., 1998). Negative emotions, such as depression and feelings of loneliness, are significant predictors of declining health status in old age (Kivela & Pahkala, 2001; Pennix, Guralnik, Ferrucci, Simonsick, Deeg, & Wallace, 1998). Low NA is characterized as a state of calmness and serenity (Watson, et al., 1988). Trait PA and NA roughly correspond to the personality factors of extraversion and anxiety/neuroticism, respectively (Watson & Clark, 1984). Whereas, NA is related to self-reported stress and poor coping (Willis, 1986) and health complaints (Tessler & Mechanic, 1978), PA is related to social activity and satisfaction (Watson, 1988a).

In light of the evidence suggesting the heritability PA and NA, and the possibility that they comprise some proportion of subjective well-being, PA and NA were measured at Time 1 and treated as covariates for this study.

### *Functional Health / Physical Impairment*

The negative impact of physical health problems on the quality of life of older adults is well documented in the gerontological literature (Vaillant, 1977). Good health can be considered a resource when dealing in the context of social exchange. Bad health can serve as a constraint (Hogan, Eggebeen, & Clogg, 1993). Functional health predicts survival and successful aging (Laukkanen, Leskinen, Kauppinen, Sakari-Rantala, & Heikkinen, 2000; Scott, Macera, Cornman, & Sharpe, 1997). Poor health may serve as a barrier to participation in prosocial behaviors, such as religious attendance or other social interactions (Fischer & Schaffer, 1993; Wilson & Musick, 1997a). Age-associated increases in chronic illness and negative self-appraisals of health are accompanied by lower levels of morale and a general absence of well-being (Bisschop, Kriegsman, Deeg, Beekman, & van Tilburg, 2004; Larsen, 1978).

Researchers have argued that information about functional status is generally more useful in determining the overall well-being of older adults (George & Fillenbaum, 1985). It is likely that functional limitations will have effects on respondents' ability to participate in certain behaviors and activities, thus creating a selection bias (Hays, Landerman, Blazer, Koenig, Carroll, & Musick, 1998). To determine baseline restrictions on activity due to functional disability, it is appropriate to measure the degree of impairment in those everyday activities that involve functioning in and out of the

home, referred to as Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs) (Lawton & Brody, 1969). IADLs are often considered rough measures of global physical and cognitive functioning. The IADL scale focuses upon the capacity of the individual to perform tasks necessary to maintain independent living (George & Fillenbaum, 1985). Research demonstrates that the ADL/IADL scales form a hierarchical relationship that is indicative of a unidimensional construct (Spector, Katz, Murphy, & Felton, 1987).

To reduce the possibility of spurious associations related to the influence of underlying health conditions on both religiosity and the outcome variables, analytic models were run first without functional health controlled, and again with those variables controlled. In this way it was possible to better determine the degree to which any apparent benefit of activities is the consequence of spurious functional health factors that may constrain individuals' activity level in the first place (Lennartsson and Silverstein, 2001).

### *Research Questions*

The literature provides a great deal of evidence as to the predictive value of religiosity for markers of resilience and successful aging outcomes in the elderly population. However, there is conflicting evidence as to the path of influence between these factors – direct, indirect, or perhaps mediated or moderated by other factors. There is also a lack of consensus as to what mechanisms may account for the relationships between these variables. For example, the positive associations between religious involvement and resilient outcomes in aging adults may be more dependent upon dispositional characteristics or other confounders than upon religious involvement itself.

Thus, there are gaps in the current understanding of how religious involvement exerts its protective influence on aging adults. One purpose of this study was to add to the literature by attempting to further delineate one possible mechanism through which religiosity casts its protective influence on aging adults. The following research questions served as a foundation for the basis of this investigation:

1. Is there a positive association between religiosity and subjective well-being in elderly adults?
2. Is the association between religiosity and subjective well-being in elderly adults mediated by optimism?

## Chapter Three

### *Methods*

#### *Purpose of the Study*

The purpose of this study is to explore the association between religious involvement and subjective well-being in elderly adults. Additionally, the study will explore the explanatory power of optimism as a possible mechanism mediating that association. Identification of these relationships will help to elucidate the pathways and mechanisms through which religious involvement influences subjective well-being, which may contribute to resiliency in older adults.

#### *Conceptual Framework for the Study*

The conceptual framework of the study is based upon the proposition that religiosity has a direct association with subjective well-being variables that, in the literature, have been associated with resilience in elderly adults. In addition to the direct effects between religiosity and subjective well-being, it was also posited that when optimism is added to the analytic model, the association would be mediated and a greater amount of variance would be explained. A significant result of the mediation model would provide a better understanding of one of the mechanisms through which religiosity confers its protective effects in predicting subjective well-being in elderly adults. A better understanding of the mechanisms through which religious involvement asserts its



influence may assist those who work with elderly adults in creating more specific interventions or services that are better able to facilitate positive outcomes. Identification of specific mechanisms of influence may facilitate the development of alternative resources that can be expected to produce similar outcomes in the absence of those already known to predict successful aging.

### *Research Hypotheses*

This study tested the following hypotheses:

1. Religiosity is positively associated with subjective well-being, after controlling for sociodemographic factors, baseline health and function, baseline measures of depressive symptomatology, life satisfaction and positive and negative affect.
  - 1.1. Religiosity is positively associated with life satisfaction after controlling for sociodemographic factors, baseline health and function, and baseline measures of depressive symptomatology, life satisfaction and positive and negative affect.
  - 1.2. Religiosity is inversely associated with depressive symptomatology after controlling for sociodemographic factors, baseline health and function, and baseline measures of depressive symptomatology, life satisfaction and positive and negative affect.
2. The association between religiosity and subjective well-being in elderly adults is mediated by optimism, after controlling for sociodemographic factors, baseline health and function, and baseline measures of depressive symptomatology, life satisfaction and positive and negative affect.

- 2.1. The association between religiosity and life satisfaction in elderly adults is mediated by optimism, after controlling for sociodemographic factors, baseline health and function, and baseline measures of depressive symptomatology, life satisfaction and positive and negative affect.
- 2.2. The inverse association between religious involvement and depressive symptomatology in elderly adults is mediated by optimism, after controlling for sociodemographic factors, baseline health and function, and baseline measures of depressive symptomatology, life satisfaction and positive and negative affect.

### *Sampling and Data Collection Procedures*

#### *Data Source*

There have been a number of cross sectional and longitudinal studies that have explored the relationships between religion and a number of outcomes such as optimism, morbidity and mortality in the elderly. Fewer studies have been conducted utilizing a framework that attempts to identify mechanisms accounting for religiosity's effects and delineate causal paths between measures of religiosity and selected outcomes commonly associated with successful aging and resilience in the elderly. Because many of the previous studies have been confined to cross-sectional data, they have been limited in their ability to establish causal explanations for associations between many of these variables. The *Buffers of the Impairment/Disability Cascade Among the Old-Old Study*, an ongoing, National Institute on Aging-funded, longitudinal study initiated by the Elderly Care Research Center at Case Western Reserve University in 1989, provides an excellent opportunity to explore the influences both religiosity and optimism in an elderly

population. The data for the current study were taken from the first, fifth and tenth waves of this NIA study of late-life adaptation to aging and increasing frailty.

This original study, currently in its 16<sup>th</sup> year of data collection, utilizes a survey design with an extensive interview instrument that incorporates both open-ended and closed-ended responses. The questionnaire includes questions on socioeconomic factors, self-rated health, chronic illness and disease, pain, fall incidents and concerns, incontinence, functional health, use of healthcare and medications, ADLs and IADLs, sensory deficits, depression, self-esteem and efficacy, life-style habits, social life, prosocial activity, religiosity, traumatic event history, and use of technology. Initial data collection began in 1989 with approximately 1000 adults, 70 or older, who were randomly selected from a large, age-segregated, retirement community in Clearwater, Florida.

#### *Florida Retirement Study Sample*

Eligibility criteria for the original study required that participants be at least 72 years old, reside in Florida at least 9 months of the year, be free of major mental and physical infirmities (e.g., confused or bedridden) (Kahana, et al., 2002) and be sufficiently healthy to be able to complete a 60-90 minute face-to-face interview. All respondents own their one to three bedroom homes within an age-segregated, planned retirement community that is oriented toward independent, activity-based living. There are some support and social / recreational services provided within the complex, such as a community-owned bus that transports residents to area grocery shopping, exercise equipment, pool, tennis, and shuffleboard available at the clubhouse, and minimal

volunteer opportunities in the complex (e.g., gift shop, good neighbor, building representatives). The retirement community's central location in the broader community affords residents convenient access to a wide range of health care services and social, educational, and leisure and recreational resources. The city bus makes stops within the community, and residents can also arrange bus transportation to area attractions, such as the Hard Rock Casino.

Respondents in the original study were initially contacted at random using computerized resident listings of the retirement community. The principal investigators reported a mean age of respondents in the first wave of the study as 79.3 years (Kahana & Kahana, 2002). The sample is comprised largely of Caucasian residents who have previously migrated from the Midwest (approximately 50%) or the East coast (30%) (Kahana, Lawrence, Kahana, Kercher, Wisniewski, et. al., 2002). Due to its lack of ethnic and cultural diversity, generalizability to the population as a whole may be questioned. However, the sample is consistent with the population composition of both the retirement community itself and the surrounding community as a whole (U.S. Bureau of the Census, 2000). Consistent with other studies of aging adults, women make up the majority of the sample (67%), a fact that is not surprising in as much as they have a greater life expectancy than men (Hooyman & Kiyak, 1999).

Original participants in the Florida Retirement study were predominantly of Protestant religious affiliation (68%), and had working class or middle class backgrounds. Respondents were generally well-educated, with a mean education level of 14 years (Kahana, et al., 2002). Participants are interviewed annually, generally in their home or at an arranged location of the respondent's choosing (e.g., clubhouse), and

are modestly compensated for their time and participation (\$5.00 gift certificate to a nearby supermarket).

### *Participant Interviews*

To maximize confidentiality and minimize strain on respondents as they become increasingly frail with age, participants are interviewed in their homes or, at their request, at the complex community center, by specially trained interviewers. The introduction of intra-interviewer bias is reduced due to the fact that there has been minimal turnover in interviewing staff, and the original interviewer for the study has assisted in training newer additions to the staff. The original group of respondents is interviewed each year by a single interviewer who has been with the study since its inception. Interviews take between 1.5 and 2.0 hours (time tends to increase with age of respondent). The interview consists of both closed-ended and open-ended questions. Previous research suggests that when personal interviews are used, the use of cards with printed response choices are helpful (Kutner, Ory, Baker, Schechtman, Hornbrook, Mulrow, 1992). At each interview, response cards are provided for each of the close-ended questions. Upon completion of the interview, each respondent is given a copy of the Medical Options Study Short Form (MOS, SF-36) (Ware, & Sherbourne, 1992) and asked to complete the form within the next few days and place it in a self-addressed envelope that has been provided so that it can be mailed directly to the principal investigators for follow-up data collection. Data from annual respondent interviews are entered into a central database and stored in SPSS format.

### *The Current Study*

Three waves of the Florida Retirement Study data were utilized for analysis in this doctoral study, Time 1, Time 5, and Time 10. As is common in longitudinal studies, the original study population has decreased through attrition. The study was initiated in 1989 with 1000 participants. At Time 5, the database includes 591 respondents and at Time 10, 366 of the original respondents were still participating in annual interviews. It might be argued that given the documented lack of variance of some variables over time (e.g., optimism, life satisfaction), and the probability of moderate change over long periods of time (e.g., 4-9 years) due to the aging process, the use of three widely separated waves may be less than adequate. However, the characteristics of the dataset - not all variables included in this study were measured at each wave - dictated the ultimate choice of waves to be analyzed. For example, optimism is measured at Time 5 and Time 10, but not at Time 1. Time 1 provides descriptive values for the study sample, baseline measures of a number of variables that will be used as controls for the analysis, and measures of the independent variable. Time 5 provides measurements of the proposed mediating variable. Outcome variables are measured at Time 10. Thus, specific waves of data have been chosen based upon the fact that they offer repeated access to the greatest selection of the variables included in this study.

Relevant study variables were extracted from each of the three waves chosen for analysis. Data analyses were first completed on each wave independently. Next, Time 1 and Time 5 data were merged and analyzed for those who were in both waves. Finally, data from Time 1, Time 5 and Time 10 were merged and analyzed for those respondents who had valid responses for all three waves of the study.

### *Missing Data*

The analytic sample included all respondents with complete data or limited missing data as determined by the following criteria: a) One case that had no valid data for any study variables was deleted from analysis; b) Cases that were missing responses to entire scales were flagged and moved to a non-sample subset for comparative analyses; c) For variables where “refused” was a response option (e.g., total assets, religious preference), refused was recoded to missing, and the case was moved to the non-sample subset; d) Cases that were missing data for stand-alone variables (versus scale items) were moved to the non-sample subset; e) For cases that were missing one or two scale items (except for the independent variable religiosity), mean item scores were created for missing responses; and f) cases missing data for any of the religiosity scale items were moved to the excluded cases subset. These strategies resulted in a Time 1 sample of 797. Analysis at Time 5 was completed on 532 respondents, and at Time 10, data was analyzed for 335 respondents. Analyses for merged samples Time 1 and 5 were completed for a sample of 430, and the final sample, comprised of merged Time 1, Time 5 and Time 10 datasets had a final N = 255.

### *Measures*

#### *Dependent Variables – Subjective Well-being*

##### *Life Satisfaction*

Moods and emotions, labeled affect, represent people’s evaluations of the events that occur in their lives (Diener, et al., 1999). Life satisfaction forms a separate factor from the two major types of affect (PA/NA) (Andrews & Withey, 1976; Lucas, Diener, &

Suh, 1996). Life satisfaction refers to the conscious, cognitively judgmental process that individuals use to assess the quality of their lives in accordance with their own unique set of criteria (Shin & Johnson, 1978). Diener and colleagues (1985) argue that, because individuals tend to assign different standards of success to different domains of their lives, it is necessary to assess an individual's global judgment of his or her life, rather than focusing solely on satisfaction with specific domains. That is the strategy upon which the Satisfaction With Life Scale was developed (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985). The SWLS does not measure all aspects of subjective well-being. It is a narrow-band instrument intended to assess the cognitive rather than affect component of subjective well-being. As such, the SWLS items are global rather than specific in nature, and allow respondents to weight domains of their lives in terms of their own values in determining a global judgment of life satisfaction (Pavot & Diener, 1993). Normative data for the SWLS are available for older adults and a number of other diverse populations (see Pavot and Diener, 1993 for listing). The SWLS has been shown to correlate substantially with reports by family and friends of the target subject's life satisfaction and with other life satisfaction scales, and has been found to be valid and reliable with elderly respondents (Pavot & Diener, 1993). The SWLS has shown strong internal reliability and moderate temporal stability, with Diener and colleagues (1985) reporting a coefficient alpha of 0.87 for the scale and a 2-month test-retest stability coefficient of 0.82. Similar findings were reported by Pavot, et al. (1991) and Yardley and Rice (1991). Evidence for the construct validity of the SWLS with other measures of subjective well-being has been demonstrated as well (Pavot & Diener, 1993). The reliability coefficient alpha for the scale in this study was .82. Initial principal-axis factor



analysis indicating a single factor structure accounting for 66% of the variance (Diener, et al., 1985) has been replicated (Pavot & Diener, 1993; Pavot, Diener, Colvin, & Sandvik, 1991) and shown to be consistent between sexes (Atienza, Balaguer, Garcia-Merita, 2003; Shevlin, Brunsten, & Miles, 1998). There is also strong evidence of construct validity (Pavot & Diener, 1993). The SWLS is presented in figure 2.

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
In most ways, my life is close to my ideal	1	2	3	4	5
The conditions of my life are excellent	1	2	3	4	5
I am satisfied with my life	1	2	3	4	5
So far, I have gotten the important things I want in life	1	2	3	4	5
If I could live my life over, I would change almost nothing	1	2	3	4	5

*Figure 2.* Satisfaction With Life Scale (SWLS)

The SWLS was available for each of the three waves analyzed in this study. New variables were created at each wave by summing the five items for each respondent to represent total life satisfaction scores. There were no missing data for the scale at Time 1 or Time 5. Respondent mean item totals were imputed for three respondents at Time 10

that were missing one item score each. Higher scores reflect higher levels of life satisfaction. No reverse-coding was necessary for this scale since the codebooks for this scale at Time 1 and Time 5 indicated that response options were flipped at data entry, and that the response items were printed in reverse order on the original interview instrument. The life satisfaction variable at each wave was included in bivariate analyses to determine associations and correlations with other scales and variables in the study, and was included as a control variable at baseline and as a dependent variable at Time 10.

### *Depressive Symptomatology*

One of the most commonly used measures of depression and psychological well-being is the Center for Epidemiologic Studies of Depression Scale (CES-D) (Radloff, 1977). The original CES-D scale consists of 20 items representing depressive symptoms for which participants are asked to indicate the frequency of occurrence during the past year. A four-point Likert scale is used to score responses ranging from rarely or none (1) to all or most of the time (4). The CES-D has been found to be reliable and valid with older adults (Radloff & Teri, 1986; Wallace, et al., 2001), who, except for the severely cognitively demented, have been found to be reliable informants regarding their affective states (Lewinsohn, Seeley, Roberts, & Allen, 1997; Parmelee, Katz, & Lawton, 1989), and has consistently demonstrated reliability and validity in community surveys (Radloff, 1977). It has been demonstrated that screening tools with high reliability (e.g., reliability of approximately 0.90) can be shortened, sometimes by dropping as many as 75% of the items, without losing much of their sensitivity and specificity (Lewinsohn, Seeley, Roberts, & Allen, 1997; Shrout & Yager, 1989). Revised versions of the CES-D,

regardless of scoring methods, have produced comparable reliability, sensitivity, specificity, and positive predictive values to those reported for the original 20-item CES-D (Boey, 1999; Cheng & Chan, 2005; Irwin, Artin, & Oxman, 1999; Kohout, Berkman, Evans, & Cornoni-Huntley, 1993; Turvey, Wallace, & Herzog, 1999). For this study, levels of depressive symptomatology were measured with a revised CES-D scale that was constructed with ten items from the original CES-D scale that were present in each of the three waves of data. This revised version of the CES-D is provided in figure 3

	<b>Never/ Rarely</b>	<b>Some/ Little</b>	<b>Occasionally</b>	<b>Most of the time</b>	<b>All of the time</b>
1. I felt that I could not shake off the blues, even with help from family or friends	1	2	3	4	5
2. I could not keep my mind on what I was doing	1	2	3	4	5
3. I felt depressed	1	2	3	4	5
4. I was hopeful about the future	1	2	3	4	5
5. I was happy	1	2	3	4	5
6. I felt lonely	1	2	3	4	5
7. I enjoyed life	1	2	3	4	5
8. I had crying spells	1	2	3	4	5
9. I felt sad	1	2	3	4	5
10. I could not “get going”	1	2	3	4	5

*Figure 3.* Revised CES-D Scale

Items 4, 5, and 7 were recoded so that all responses were scored in the same direction, with higher scores indicating higher levels of depressive symptomatology. To score the scale, in line with similar research, response options for the Likert scale were converted to a 0-3 format (0 = never / rarely; 1 = some / little; 2 = occasionally; 3 = most / all the time), and scale totals for depressive symptomatology were computed for each respondent. Scale sum scores could range from 0 - 30. The summed scores were then used to create a new variable at each wave, dep1, dep5 and dep10. The reliability of this revised scale was assessed by calculating coefficient alpha (Cronbach, 1951), and was found to have an internal consistency of .81 (Table 1). Initial baseline scores on this revised CES-D scale are included as a control variable in order to reduce chances of confounding. Scores from the revised scale at Time 10 serve as a dependent variable. One hundred seven cases were deleted from the original sample at Time 1 due to having no valid responses for the CES-D items. One case was removed from Time 5 and three cases were removed from Time 10. Five respondents missing one scale item each at Time 10 had their own mean item score inserted for missing scale items.

Table 1

*Means, Standard Deviations, Intercorrelations, and Coefficient Alpha Reliability*

*Estimates for Time 1 Scales*

<b>Variables</b>	<b>Mean</b>	<b>SD</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
1. NA1	8.49	3.14	(.80)							
2. PA1	16.00	3.80	-.01	(.75)						
3. SWLS1	18.73	3.28	-.33	.19	(.82)					
4. Dep 1	6.95	4.90	.52	-.30	-.45	(.81)				
5. religiosity1	0.01	0.76	.02	.20	.10	-.10	(.87)			
6. IADLs 1	1.13	0.41	.16	-.04	-.10	.20	-.04	(.88)		
7. ADLs 1	1.04	0.23	.09	-.04	-.05	.08	-.04	.54	(.84)	

Note: N = 797. Reliability estimates appear on the diagonal

*Estimates for Time 5 Scales*

<b>Variables</b>	<b>Mean</b>	<b>SD</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
1. NA5	9.02	3.78	(.83)							
2. PA5	15.06	3.99	-.11	(.78)						
3. SWLS5	18.02	2.94	-.31	.32	(.81)					
4. Dep5	8.54	5.19	.65	-.44	-.48	(.84)				
5. religiosity5	0.00	0.85	.03	.37	.15	-.15	(.91)			
6. IADLs 5	1.39	0.56	.22	-.29	-.25	.41	-.03	(.82)		
7. ADLs 5	1.06	0.24	.08	-.13	-.12	.18	-.05	.41	(.79)	
8. Optimism 5	21.87	2.63	-.34	.40	.39	-.48	.23	-.17	-.11	(.74)

Note: N = 567. Reliability estimates appear on the diagonal

*Continued on next page*

Table 1 continued  
*Estimates for Time 10 Scales*

Variables	Mean	<u>SD</u>	1	2	3	4	5	6	7	8
1. NA10	9.43	3.90	(.84)							
2. PA10	16.46	3.61	-0.15	(.78)						
3. SWLS10	18.65	3.65	-.39	.51	(.87)					
4. Dep 10	9.72	5.80	.63	-.53	-.64	(.88)				
5. religiosity10	.01	0.85	.06	.31	.26	-.07	(.92)			
6. IADLs 10	1.55	0.74	.14	-.04	-.10	.25	-.05	(.91)		
7. ADLs 10	1.19	0.45	.06	-.14	-.17	.13	-.02	.74	(.87)	
8. Optimism 10	22.44	3.82	-.38	.55	.68	-.68	.22	-.15	-.08	(.86)

*Note:* N = 359. Reliability estimates appear on the diagonal

### *Independent Variable*

#### *Religious Involvement*

In line with current literature that suggests that religiosity is more adequately measured by a multidimensional scale, six variables were chosen to create a religiosity index for this study. Conceptually, this index allows for inclusion of a wide variety of behavioral aspects, such as attendance at worship services, participation in church activities other than formal services, as well as attitudinal and subjective aspects such as values and beliefs ( I find comfort in religion, I put trust in God, seek God’s help in stressful times), and salience (e.g., perception of religiousness), all previously shown to be important when exploring the association between religiousness and well-being (Ainlay & Smith, 1984; Glock & Stark, 1965; Krause, 1993; Idler, et. al., 2003). These variables were chosen because they appear in each of the three waves, thus can be used to

determine correlations between time points, and because they, or variables very similar to them, have been used in the current literature, thus facilitating study comparisons. Due to the uniqueness and personal variability of these variables, and their importance in formulating the independent variable at baseline, respondents with missing data on these items at Time 1 were not included in the study sample. Because there were unequal levels of response options for the variables, the scores were standardized prior to the development of a religiosity score, which is based upon the sum of the item responses, with higher total scores representing higher levels of religiosity. For descriptive purposes, religious preference is included at Time 1. The Religiosity Index appears in Figure 4.

Domain\Variable	Item Wording	Response Options
<u>Affiliation</u> (RELIGA)	What is your religious preference?	(1) Protestant (i.e., Methodist, Baptist, Presbyterian.) (2) Catholic (3) Jewish (4) Other - Please specify _____ (5) Refused (6) None

*Continued on next page*

Domain\Variable	Item Wording	Response Options
<u>Organizational Religiosity</u>		
(ATTENDA)	How often do you attend religious services?	(0) Never (1) Less than once a yr. (2) Once or twice a yr. (3) Several times a yr. (4) About once a mo. (5) 2-3 times a month (6) Several times a wk. (7) Every day (8) Refused
(ACT9A)	How often do you participate in church activities?	(1) Several hrs./day (2) One hr/less /day (3) Several times/week (4) Several times/month (5) Rarely or never
<u>Nonorganizational Religiosity</u>		
(Religious coping)	When confronted with stress, I try to find comfort in my religion	(1) Never (2) Seldom (3) Sometimes (4) Usually (5) Very Often
(Religious coping)	When I'm confronted with stress, I put my trust in God	(1) Never (2) Seldom (3) Sometimes (4) Usually (5) Very often

*Continued on next page*



Domain\Variable	Item Wording	Response Options
Subjective Religiosity (Saliency)	How religious do you consider yourself?	(1) Not at all (2) Not very religious (3) Somewhat religious (4) Religious (5) Very religious
Support / Comfort (Religious support)	When I am confronted with stress, I seek God's help	(1) Never (2) Seldom (3) Sometimes (4) Usually (5) Very often

*Figure 4. Religiosity Index*

#### *Psychometric Evaluation of Instruments*

Many scales included in this study have been used extensively in previous research. For these instruments, established reliability and validity data from the literature have been provided. To be considered reliable, an instrument must provide consistent scores upon repeated administration, upon administration by alternate forms, etc. (Hatcher, 1994). Thus, reliability reflects the consistency of the scores that are obtained with the instrument in question. In research that involves the use of questionnaire data, the most commonly used method of ascertaining consistency and reliability, are the internal consistency indices of reliability (Hatcher, 1994). Internal consistency is the extent to which individual items that are combined in a test or questionnaire correlate with one another or with the test total. One of the most widely-used indices of internal consistency reliability in the social sciences is the coefficient alpha (Cronbach, 1951; Hatcher, 1994). Coefficient alpha reflects the lowest estimate of

reliability that can be expected for an instrument (Hatcher, 1994). A high coefficient alpha indicates that the items that constitute the scale or instrument in question are highly correlated with one another. In most research, coefficient alphas of less than 0.70 are generally seen as inadequate (Nunnally, 1978). Table 1 presents assessments for scale reliabilities for the current study, which all demonstrate acceptable levels.

Since the index used to measure religiosity was created for this study, and thus, no psychometric information is available in the literature, it was necessary to explore the underlying scale structure. Exploratory factor analysis can be used to determine whether the items included in a scale “hang together” to tap the same dimension or factor (Pedhazur & Pedhazur Schmelkin, 1991). It is essential for the items to demonstrate adequate correlation with factors in order for a total score to be meaningful. Factor analysis then, can be used to help justify the validity of a summated scale used to represent a particular construct or set of constructs (Munro, 2001). Factor analysis was conducted using the 6 items chosen to create the religiosity index. The principal factor method was used to extract factors, minimum eigenvalues of 1.00 were specified, significant factor loadings were set at .40, and promax rotation was specified. The scree plot indicated one general factor, which accounted for 0.97 % of the variance, and factor pattern results, shown in Table 2, indicated that all six items demonstrated significant loadings on the single factor of 0.41 or greater. Rotation could not be completed due to the one-factor solution. Intercorrelations of the variables in the scale are shown in Table 3. Fleury (1998) and Munro (2001) argue that, in order for meaningful results to be obtained in a factor analysis, correlations between variables should be substantial and that each variable should be highly correlated with at least one other variable. These

researchers have noted that, in such circumstances, it is common to look for correlations between 0.30 and 0.70. Each variable in the religiosity index was correlated with at least one other variable at a minimum of 0.34. A subsequent assessment of scale reliability through calculation of coefficient alpha (Cronbach, 1951), demonstrated a moderately high reliability estimate of 0.87 (Table 2).

Table 2

*Factor Loadings for One-factor Solution of the Religiosity Scale*

<b>Factor Loading</b>	<b>Variable Label</b>	<b>Description</b>
.59	ATTENDA	During the past year how often have you attended religious services?
.41	ACT9A	How often do you participate in church or synagogue activities (not including services)?
.71	RELITENA	How religious do you consider yourself?
.89	COPE5A	To what extent do you seek God's help during stressful events or illness?
.88	COPE13A	To what extent do you put your trust in God when confronted with stressful events or illness?
.88	COPE21A	To what extent do you try to find comfort in your religion when confronted with stressful events or illness?

Table 3

*Correlations Between Individual Items Comprising the Religiosity Index (N = 797)*

<b>Variable</b>	<b>Attendance</b>	<b>Activities</b>	<b>How Religious</b>	<b>Seek God's Help</b>	<b>Trust in God</b>	<b>Comfort in Religion</b>
Attendance	1.00	.57	.47	.43	.44	.49
Activities	.57	1.00	.34	.25	.29	.29
How religious	.47	.34	1.00	.57	.57	.60
Seek God's Help	.43	.25	.57	1.00	.84	.80
Trust in God	.44	.29	.57	.84	1.00	.81
Comfort in religion	.49	.30	.60	.80	.81	1.00

### *Mediators*

#### *Optimism*

Optimistic orientation, the proposed mediating variable, was measured at Time 5 with a revised version of the Life Orientation Test (LOT-R) (Scheier & Carver, 1985; Scheier, Carver, & Bridges, 1994). Some investigators report that factor analyses of the LOT reveal a two-factor solution, one consisting of items reflecting positive expectancies, and the other consisting of the negatively worded items representing negative expectancies (Marshall, Wortman, Kusulas, Hervig, & Vickers, 1992; Scheier & Carver, 1985). The original scale developed by Scheier and colleagues (1994) was meant to assess optimism as a bipolar dimension and contained 10 items, three positively

oriented items, four negatively oriented items and three filler items that are not used in scoring. The test developers recommend that one of the negatively worded items be eliminated from scoring so that equal numbers of positively and negatively oriented items are used in calculating a total test score. Correlations between optimism and pessimism measured by the scale have been found to range from very low (-0.02) to moderate (-0.57) (Brenes, et al., 2002). Although the developers of the scale initially treated optimism and pessimism as bipolar opposites, they subsequently have suggested consideration of evaluating optimism and pessimism independently (Brenes, et al., 2002; Scheier, Carver, Bridges, 1994). However, there is no steadfast rule in the literature precluding the use of the scale to represent one overall score of optimistic orientation.

In more recent research, the LOT has been revised by dropping the filler items to reduce the scale to 6 items – three measuring positive optimistic outlook and three measuring more negative outlook. The LOT-R has been found to correlate 0.95 with the original version of the Life Orientation Test (Scheier, et al., 1994). An acceptable level of internal consistency for the revised scale has been demonstrated (Cronbach's Alpha 0.78), test-retest reliability has been shown to be fairly stable over time (0.60 at 12 months; 0.56 at 24 months; 0.79 at 28 months), and convergent, discriminant, and construct validity have been supported (Scheier, et. al., 1994; Terrill, Friedman, Gottschalk, & Haaga, 2002).

In light of the debate in the literature regarding the number of constructs represented by the LOT, factor analyses were completed to determine the most parsimonious solution. The best solution appeared to be a one factor model, with the proportion of variance explained above 100% and five of six items with significant

loadings on one factor. A subsequent assessment for reliability produced an acceptable coefficient alpha of .73. (Coefficient alpha assessed for optimism and pessimism in a two factor solution produced an unacceptable pessimism scale alpha of .45 and an alpha of .79 for optimism).

Data for the proposed mediating variable is taken from the LOT as measured at Time 5. Respondents are read a series of short statements and asked to indicate, using a Likert scale, the degree to which they agree or disagree with the statements. Three statements are negatively worded and three are positively worded. No filler items are included. Response options were previously flipped in the original dataset. The three negatively worded items are reverse coded. Responses are summed to create a variable representing each respondent's overall optimism score with higher scores representing greater optimism.

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
In uncertain times, I usually expect the best	1	2	3	4	5
If something can go wrong for me, it will	1	2	3	4	5
I always look on the bright side of things	1	2	3	4	5
I'm always optimistic about my future	1	2	3	4	5
I hardly ever expect things to go my way	1	2	3	4	5
Things never work out the way I want them to	1	2	3	4	5

*Figure 5. Life Orientation Test (Optimism)*

### *Confounders or Covariates*

Confounders are variables that may exert influence on either, or both of the independent and dependent variables. If the effect of a confounder is not accounted for, the contribution of the causal variable to the outcome is unclear or spurious. In extreme cases, the association between an independent and dependent variable will disappear when the confounding variable is statistically controlled, indicating that the independent and dependent variables are independent of each other and only covary when the control variable is taken into consideration (Aneshensel, 2002). Conversely, if the addition of the control variable does alter the relationship between the independent and dependent variables, or if there is significant left over covariation, the association between them cannot be attributed to spurious relationships (Aneshensel, 2002). Therefore, to reduce the possibility of spurious results, a number of control variables suggested in the literature as possible influences on the independent, mediating, or dependent variables are accounted for in the data analysis for this study. For example, it is anticipated that respondents with greater socioeconomic resources, such as education and income, or who report higher levels of general and functional health will be more likely to report higher levels of optimism and life satisfaction and lower levels of depressive symptomatology. Likewise, it is anticipated that respondents who report higher levels of positive affect and lower levels of negative affect will report higher levels of optimism and life satisfaction and lower levels of depressive symptomatology. In addition, investigators (e.g., Ensel & Lin, 1991) have also suggested that age, sex, race, education, family income, and marital status must be controlled when studying depression outcomes to avoid spurious results. It also seems reasonable to assume that general health and functional ability could

influence such variables as religious attendance and activity participation. Thus, a number of control variables have been selected based upon their previously reported associations or currently presumed relationships with the study variables. Control variable data is taken from wave one.

### *Physical Health & Functional Ability*

Physical health and functioning were assessed using the following measures: The chronic conditions subscale of the Older Americans Resources Study (OARS) Illness Index (Duke University, 1978) used as an aggregate index of pathology (Fillenbaum, 1978; George & Fillenbaum, 1985); disability, as assessed by the OARS Index of Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) scales (Fillenbaum, 1978; George & Fillenbaum, 1985).

The OARS Index has been widely used in studies of health and functioning in late life (George & Fillenbaum, 1985) because of its basic assumption that when assessing the functional level of the elderly, a comprehensive approach must be taken (Fillenbaum, 1988). The OARS has documented psychometric properties among elderly respondents (Mangen & Peterson, 1982), with some researchers reporting an inter-rater reliability of 0.88 (physical functioning) and 0.74 (mental functioning) (Krach, DeVaney, DeTurk, & Zink, 1996). The physical health index identifies various physical conditions and clinical symptoms. Respondents are asked to indicate whether they have experienced any of the following chronic conditions over the past year: anemia; arthritis; asthma; glaucoma, cataracts or other eye diseases; emphysema/chronic bronchitis; osteoporosis; high blood pressure; heart trouble; diabetes; ulcers; stomach or intestinal disorders; thyroid, liver or



kidney disorders; cancers or leukemia; stroke, Parkinson's Disease, urinary tract disorders (including prostate); orthopedic problems; skin disorders. Responses are coded 0 (none) or 1 (respondent reports having the condition). The conditions were summed to create a new variable at each wave representing a total OARS Index score.

The OARS Index of IADLs and ADLs assess respondents' degree of performing habitual and universal personal care activities. The Physical ADL index focuses on personal maintenance tasks of washing and bathing, dressing and putting on shoes, getting to or using the toilet, getting in/out of bed unassisted, eating without assistance. Respondents are asked how often, without assistance, they have difficulty performing the tasks. Possible responses are based on a Likert scale reflecting the following responses, (1) never, (2) occasionally, (3) frequently, and (4) always. To obtain an aggregate score reflecting each respondent's level of disability, scores were first summed then a mean score was tabulated. Higher mean totals indicate greater difficulty. Scores were created for respondents in each wave. Baseline scores were entered as control variables. Scores at Time 5 and Time 10 were used for descriptive and bivariate purposes. Cronbach's alpha reliability estimates for this scale at Time 1 were .83 (Table 1).

IADL disability was measured by the total number of the following activities done with difficulty: getting from room to room, going out of doors, walking up and down stairs, doing your own housework, preparing your own meals, shopping for groceries. Possible responses are based on a Likert scale reflecting the following responses, (1) never, (2) occasionally, (3) frequently, and (4) always. Scores were summed then a mean was tabulated to form an aggregate score with higher totals indicating more difficulty/disability. Baseline scores were entered as control variables.

Scores at Time 5 and Time 10 were used for descriptive and bivariate purposes.

Cronbach's alpha reliability estimates for this scale at Time 1 were .88 (Table 1).

### *Health Self-Appraisal*

Health self-appraisal is measured at baseline by respondents' responses to the question, "In general, do you consider yourself to be a very healthy, healthy, fairly healthy, sick, or very sick person?"

### *Positive and Negative Affect*

Recent findings have demonstrated that measures of psychological adjustment, such as depression and life satisfaction, are strongly associated with mood (Chang, Maydeu-Olivares, & D'Zurilla, 1997). Mood has been shown to be composed of two distinguishable dimensions, positive and negative affect (Chang, Sanna, Yang, 2003). Positive affectivity reflects the extent to which individuals generally feel active, alert, and enthusiastic. Whereas negative affectivity reflects the extent to which individuals generally feel upset or unpleasantly aroused (Watson, et al., 1988). Researchers have demonstrated that the PA and NA dimensions, often thought to be opposites, actually emerge as two dominant and relatively independent dimensions of affect (Hillerås, Jorm, Herlitz, & Winblad, 1998; Kercher, 1992; Schumkle, Egloff, & Burns, 2002; Watson & Clark, 1992). Investigators have further suggested that positive emotions serve as important psychological resources that an individual may use in coping with stressful events or in reaction to, or adaptation to, changes in life situations, thus facilitating well-being (Fredrickson & Joiner, 2002; Hobfoll, 1989). Other researchers have suggested that negative affect be controlled in similar analyses because of the biasing effects of common

method variance that negative affect may have on self-reports of some of the more emotionally-based variables (e.g., see Symister & Friend). Chang and colleagues (2003) stress that, when working with a mediation model, it is important to demonstrate that the influence of a variable such as optimism on psychological adjustment is not fully mediated by affectivity. Thus, to reduce the possibility of spurious effects created by the influence of dispositional characteristics of positive and negative affect on the independent, mediating and dependent variables, PA and NA are measured at Time 1 with the PANAS and added to the model as covariates. Construct validity of the PANAS has been reported in Watson et al. (1988).

Kercher (1992) demonstrated the viability of using a shortened version of the PANAS with a sample of old-old subjects. The subscales produce reliable and essentially uncorrelated PA/NA subscales that have high discriminant and convergent validity and reliability (Kercher, 1992). The psychometric qualities are parallel to those obtained in other studies with younger subjects, and each of the two five-item PANAS subscales demonstrated good factor structure, high discriminant validity and reasonable reliability (Kercher, 1992).

The shortened PANAS subscales have been used in this study. Respondents are asked to indicate the extent to which they felt ten different emotions over the past year. Sum score variables were created to represent PA and NA subscales. The PA subscale included the following adjectives: excited, enthusiastic, alert, inspired, and determined. The NA subscale included: distressed, upset, scared, nervous, and afraid. Response items were *not at all*, *a little*, *somewhat*, *quite a bit*, and *very much* (coded 1 through 5). Evidence has shown that PANAS measures of PA/NA perform similarly regardless of the

time frame used in the assessment of mood, such as “today,” “past few weeks,” or “past year” (Watson, 1988b). Coefficient alpha for the PA and NA scales in this study were .76 and .79 respectively (Table 1). The revised PANAS scale is presented in Figure 6.

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**During the last year, to what extent did you feel the following emotions:**

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	Not at all	A little	Somewhat	Quite a bit	Very Much
a. Excited	1	2	3	4	5
b. Distressed	1	2	3	4	5
c. Upset	1	2	3	4	5
d. Scared	1	2	3	4	5
e. Enthusiastic	1	2	3	4	5
f. Alert	1	2	3	4	5
g. Inspired	1	2	3	4	5
h. Nervous	1	2	3	4	5
i. Determined	1	2	3	4	5
j. Afraid	1	2	3	4	5

---

*Figure 6.* PANAS Scale

*Sociodemographic Variables*

Although subject race is commonly included as a control variable in social and behavioral research, it was not included in this study due to the fact that in the initial waves of the study, the sample population was comprised of only Caucasian subjects.

### ***Age***

Age can be considered as controlled by design, due to the fact that possible participants were chosen from a sample population who reside in an age-restricted, retirement community. Age was measured according to the self-reported age in years reported by each respondent in their baseline interview.

### ***Gender***

Gender was measured as a dichotomous variable, male or female.

### ***Education***

Educational level was measured as a continuous variable at baseline.

### ***Marital Status***

Dummy variables were created to reflect three possible categories for marital status, never married, married, and previously married.

### ***Income/Total Assets***

To reflect the fact that the vast majority of respondents for this study are retired, and therefore, not reliant on an occupational income, income was operationalized as a self-reported measure of total assets. Respondents were asked if they could give an estimate of the total worth of their family's assets, including such things as the equity in their home, savings, and investments. Response categories included refused, none, and 14 choices that range from less than \$10,000 to \$300,000 or more. There were no

refused responses for sample cases. Median income (\$150,000 – 174,999) was inserted for 82 respondents with missing data for this variable.

<b>Variable</b>	<b>Response Options</b>
Age	Continuous variable
Sex	1 = Male 2 = Female
Marital Status	0 = Never married 1 = Married 2 = Previously married
Years of Formal Education Completed	Continuous variable
Total Assets	15 levels of income
Living Status	1) Alone 2) Not Alone

*Figure 7. Sociodemographic Control Variables Selected for Study Inclusion*

### *Data Analysis*

The SAS software program version 9.1.3 (SAS Institute Inc, Cary, NC) was used for data analyses. Data analysis for this study included three aspects, evaluation of the psychometric properties of measures or instrumentation where appropriate, descriptive univariate and bivariate analyses, and multivariate analyses. Description of these steps follows.

### *Univariate Analyses*

Univariate descriptive analyses provide appropriate methods for screening the data to ensure that they have been entered correctly and are being read correctly by the program and for establishing a more in-depth description of the characteristics of the study sample. Frequency distributions of every variable in the study were computed to determine the amount and pattern of missing data. Further, for categorical variables, frequency distributions can be helpful in determining the need for collapsing variable categories or generating dummy variables for simplification. This procedure was utilized with the marital status variable, reducing the response options to three levels and dummy coding the data accordingly. Means and standard deviations were generated for all continuous variables. These steps are valuable tools for identifying response values that are out of range or non-meaningful, and in identifying scale items that require reverse-coding. Tests of distribution normality for each continuous dependent variable were conducted. Univariate statistics indicated that the distribution of the majority of the continuous variables in the study was generally skewed and leptokurtic. Based upon this general characteristic of the data, the Spearman coefficient was used to assess correlations between the ratio, interval and ordinal variables. The Spearman coefficient is a non-parametric, distribution-free test that makes no assumption concerning the shape of the distribution from which the study data has been drawn. For this reason, it is often used by researchers when one or both of the variables are interval or ratio level, but have skewed or non-normal distributions (Hatcher & Stepanski, 1994).

### *Bivariate Analyses*

In order to explore the impact of exclusionary criteria and loss to attrition, the first task in this process was to compare the characteristics of those respondents who are included in the sample with those that were excluded due to missing data at baseline, and those that were lost to follow-up after Time 1. Descriptive analyses and one-way ANOVAs were used to compare the groups with respect to the variables measured at baseline. Bivariate analyses were used to understand the differences between groups in relation to control variables. Significant findings from this analysis were used to determine which variables should be included as controls or covariates in further analyses. Chi square was used to determine the association between gender, living arrangement and marital status. ANOVA procedures were used to explore differences by gender and marital status in levels of other continuous control variables (age, education, assets) covariates (health self appraisal, baseline depressive symptomatology, life satisfaction, IADLs, ADLs, and chronic conditions), the independent variable (religiosity) and the dependent variables (Time 10 depressive symptomatology, Time 10 life satisfaction). Spearman correlation coefficients were calculated to assess the relationships between interval or continuous control variables and covariates (age, education, assets, number of chronic conditions, IADLs, ADLs, positive affect, negative affect) and the independent (religiosity) and dependent variables (Time 10 depressive symptomatology, Time 10 life satisfaction). Spearman correlations were also tabulated to assess relationships between the independent variable (religiosity), the mediating variable (optimism), and the dependent variables (Time 10 depressive symptomatology, Time 10 life satisfaction).



### *Analyses to Explore Possible Confounding by Health and Function Variables*

It is reasonable to assume that functional disabilities or underlying health conditions may confound attempts to identify variables that predict subjective well-being outcomes such as life satisfaction or depressive symptomatology. For example, chronic health conditions or physical infirmities could reduce a subject's ability to participate in activities or make interactions outside the home difficult or impossible. Such constraints could dramatically influence responses to some items included in the religiosity scale (e. g., religious activities participation, religious service attendance) and could significantly impact an individual's outlook on life or appraisal of health and well-being. Relevant baseline measures were added to the model in an effort to reduce the possibility of spurious associations due to the influence of underlying health conditions or physical disabilities. Further, to explore the magnitude of the impact of chronic health conditions and physical limitations, analyses were initially completed without controlling for physical health and function. Bivariate analyses demonstrated significant associations between all three health and function variables and the dependent variables that ranged from 0.12 – 0.16, with one exception. The association between baseline ADL scores and Time 10 depressive symptomatology was not significant (0.16;  $p = .06$ ). In addition, omitting the three health and function variables from the initial models that included control variables, the remaining covariates and the independent variable reduced the R-square for the models. In light of these results, and in line with current convention, each of the three health and function variables were retained for all future analyses.

<b>Control Variables Time 1</b>	<b>Covariates Time 1</b>	<b>Independent Variable Time 1</b>	<b>Proposed Mediator Time 5</b>	<b>Dependent Variables Time 10</b>
Age Gender Marital status Total assets Education Living arrangement	Health self-appraisal IADLs ADLs Chronic conditions Positive affect Negative affect Life satisfaction Depressive symptomatology	Religiosity	Optimism	Subjective well-being Life satisfaction Depressive symptomatology

*Figure 8. Variables Selected for Study Inclusion*

### *Multivariate Analysis*

Multiple regression analysis was used to analyze data for the hypotheses in this study. This type of analysis is particularly appropriate when studying the relationship between naturally occurring predictor and criterion variables – that is, variables that naturally occur in the real world and are not the product of manipulation by the researcher (Hatcher & Stepanski, 1994; O'Rourke, Hatcher & Stepanski, 2005). Multiple regression analysis is a large sample procedure requiring at least 100 observations, preferably 200, to reduce the possibility of unreliable results. The greater the number of predictor variables included in the multiple regression equation, the greater the number of subjects needed in order to obtain reliable results (Hatcher & Stepanski, 1994). The data used for this study includes an acceptable number of observations from which to obtain reliable results.

Parameter estimates ( $b$ ), standardized multiple regression coefficients ( $\beta$ ), uniqueness indices and model fit statistics were calculated using ordinary least squares regression. OLS regression is based on the principle that predicted criterion values should be calculated so that the sum of the squared errors of prediction is kept to a minimum (Hatcher & Stepanski, 1994). Parameter estimates, or multiple regression coefficients ( $b$ ), are the coefficients that are produced when the data analyzed are in raw score form. The  $b$  weight for a given predictor represent the amount of change in the dependent variable that is associated with a one-unit change in that predictor while holding the remaining predictors in the equation constant. Standardized regression coefficients ( $\beta$ ), or beta weights, are the regression coefficients that would be obtained if all the variables in the equation were standardized to a common metric with the same

standard deviation. The uniqueness index for a given predictor is the proportion of variance in the criterion variable that can be explained by that predictor, beyond the variance that is accounted for by the other predictor variables in the model. The  $R^2$  value indicates the percent of variance in the dependent variable that is accounted for by the linear combination of predictor variables. A significance test of the  $R^2$  tests the null hypothesis that  $R^2 = 0$ . The test results in an F value with an associated p value, representing the probability that an F value as large, or larger than the one produced by the test would be found if the null hypothesis were true.

### *Modeling Issues*

Research is generally driven by the desire to provide explanation. However, George (1996) argues that research should not only predict outcomes but, should also strive to reveal the processes that account for the associations between outcomes and predictor variables. The search for explanatory mechanisms or causal processes is complex, and often difficult to accomplish. Often, there are direct and indirect mediating as well as moderating effects, and temporal issues that must be considered in the research model (George, 1996). Similarly, Wallace and colleagues (2001) emphasize that it is necessary to look beyond the basic relationship between independent and outcome variables and consider the complex relation between them, as well as to examine how the two mechanisms combine to produce outcomes. It is this wisdom that drives the analyses model for this study.

### *Mediation Effects*

Mediation effects are hypothesized when it is thought that the relationship between the independent and dependent variables is indirect, or transmitted by means of an intermediary. In this situation, the independent variable influences the mediator variable, which, in turn, influences the outcome variable. Thus, the mediator variable is transmitting the effect of the independent variable to the outcome variable (Aneshensel, 2002). When mediation occurs, the mediator represents the generative mechanism through which the independent is able to influence the dependent variable of interest (Baron & Kenny, 1986).

Baron and Kenny (1986) maintain that in order to perform causal steps mediation analyses, four conditions must be met. First, a significant relationship must exist between the independent variable (religiosity) and the dependent variables (life satisfaction; depression). Second, there must be a significant relationship between the independent variable (religiosity) and the mediating variable (optimism). Third, the mediator (optimism) must be significantly associated with the dependent variables (life satisfaction; depression). And fourth, when the mediator (optimism) is controlled, the previously significant relationship demonstrated between the independent (religiosity) and dependent variables (life satisfaction; depression) must decrease significantly. Thus, the mediator acts to reduce the strength of the relationship between the independent and dependent variables. A mediational model informs how or why certain effects will occur, and can be tested using a series of regression equations (Baron & Kenny, 1986). In a mediational model, it is anticipated that the relationship between the outcome variables and the independent variables will be reduced once both the independent variable of

interest and the mediator are in the equation (Wallace, et. al., 2001). Complete mediation would be indicated if the association between religiosity and optimism and between optimism and subjective well-being (depression, life satisfaction) were significant, but previously significant associations between religiosity and subjective well-being became nonsignificant after controlling for optimism (James & Brett, 1984). Partial mediation is demonstrated when the regression coefficient is greatly reduced when the mediator is controlled (Lin, 1997), but still remains significant.

Although Baron and Kenny's (1986) recommendations have been widely cited, they come under criticism from other researchers. Shrout and Bolger (2002) discuss limitations of their approach, suggesting, for example, issue might be taken with the use of a partial mediation model approach when a model of complete mediation has been hypothesized. Baron and Kenny have argued, however, that models in which there is only partial mediation are more realistic in most social science research since a single mediator cannot be expected to completely explain the relationship between an independent and dependent variable. Nevertheless, many researchers (e. g., MacKinnon & Dwyer, 1993; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Warsi, & Dwyer, 1995; Preacher & Hayes, 2004) suggest that there are more formal and statistically rigorous methods by which mediation hypotheses may be assessed. For example, a procedure developed by Sobel (1982) may be used to provide a more direct test of a significant mediation effect. The Sobel test, a product of coefficients procedure, estimates and tests the intervening variable effect by dividing the estimate of the intervening variable effect,  $\alpha\beta$ , by its standard error and comparing this value to a standard normal distribution (MacKinnon, et al., 2002). A calculation tool for obtaining

Sobel statistics, drawn from MacKinnon & Dwyer (1993) and MacKinnon, et al. (1995) is provided by Kris Preacher at <http://www.unc.edu/~preacher/sobel/sobel.htm>. A  $z$  statistic may be calculated after entering the alpha, beta, and their standard errors as obtained in regression analyses, or by providing  $t$  statistics for alpha and beta. An absolute value of greater than 1.96, assuming a 2-tailed test of 0.05, is considered significant.

#### *Overview of Regression Model Building Process*

A number of steps were used to build the regression models for religiosity and each dependent variable. Initially, sociodemographic control variables were entered as a block to account for as much variance in the dependent variables as possible. At Step 2, the remaining proposed confounders (chronic conditions, baseline depression score, ADL and IADL composite scores, PA/NA score, life satisfaction score) were added one by one to determine the amount of variance accounted for in the overall model. For Step 3, the predictor variable (religiosity) was added to determine its relationship to the dependent variables (depressive symptomatology, life satisfaction). For Step 4, the proposed mediator (optimism) was entered in place of the dependent variables in order to determine its relationship with the independent variable (religiosity). Finally, the 5th Step was to determine if the effect of the independent variable (religiosity) on the dependent variables (Time 10 depressive symptomatology, Time 10 life satisfaction) would be reduced when the mediator (optimism) was included in the model. When all variables of interest had been entered into the regression model, a series of diagnostic tests were conducted to look for outliers, influence, leverage, and collinearity.

In interpreting results from OLS regression procedures, the model R-square indicates the percentage of variance in the dependent variable that is accounted for by the linear combination of the control and independent variables. The model R-square was used to assess the overall ability of the model containing independent and control variables to predict each dependent variable. The significance of each of the predictor variables, after controlling for all other variables in the models, in predicting outcome variables was assessed by the p-value associated with their standardized regression coefficients (beta weights).

In multiple regression procedures one is interested not only in the amount of variance accounted for, but also in the statistical significance of each of the independent variables. The fact that the  $R^2$  is statistically significant does not necessarily indicate that all the independent variables are contributing significantly to the explained variance. Testing the beta weights for each independent variable will indicate whether the variable is contributing significantly to the variance accounted for in the dependent variable. Beta weights are the regression coefficients that would be obtained if all the variables were standardized and had the same standard deviations. A p-value of less than 0.05 was used as the criterion for assessing statistical significance and rejecting the null hypothesis that the regression coefficient is equal to zero. Lastly, the uniqueness index was determined for each of the predictor variables and an F-test was used to test for statistical significance to determine if the null hypothesis was equal to zero.



### *Design Limitations*

Due to the fact that this study utilized secondary data analysis, the selection of variables representing the constructs of interest is governed by available data. For example, the variables included in successive waves are not always identical, thus restricting the ability to utilize variables based upon passage of time. Additionally, in some cases, it was necessary to forego multidimensional measurement of constructs due to lack of measures included in the original study instruments. For example, although recent literature suggests the necessity of operationalizing religious involvement or religiosity as a multidimensional construct encompassing as many as six dimensions, in early waves of the original study, fewer dimensions are addressed. This will make direct comparisons across similar studies somewhat difficult.

To maintain statistical power, it was necessary to limit the number of variables considered for analyses. A larger sample size may have allowed the addition of variables to the analytic model. For example, constructs frequently intertwined with religious involvement, such as volunteerism and social support, may provide further explanatory power to a similar investigation. Likewise, it might be helpful to include as antecedent factors dispositional variables such as altruistic orientation and other personality traits. Power issues also limited the ability to operationalize the dependent variable (SWB) as a more inclusive multidimensional measure. For example, it would have been preferable to include additional measures of life satisfaction, and variables related to social comparison, goals, meaning and purpose in life, and respondent's perception of the quality of their life.

## Chapter Four

### *Study Sample*

A total of 255 of the original 1000 respondents met the inclusion criteria for this study, which included: (1) Participation at Time 1, Time 5 and Time 10; (2) Complete data for baseline measures of sociodemographic characteristics, health self-appraisal, and chronic health conditions and religiosity measures; (3) Complete data for the proposed mediating variable, Time 5 optimism; (4) No more than two missing items on the remainder of the scales used in the study – revised CES-D (depressive symptomatology), SWLS (life satisfaction), (PANAS) positive and negative affect, IADL and ADL scales (functional health). Differences between respondents in the final study sample and respondents who were either lost to attrition or were excluded due to missing data were explored with frequency distributions, chi-square tests of independence and one-way ANOVAs.

### *Characteristics of the Sample Population at Baseline*

Data analyses at Time 1 were completed on 797 of the original 1000 study respondents. The mean age of this sample of elderly adults was 79. Women ranged in age from 71 to 95 years of age, with a mean of 78. Men ranged in age from 72 to 93 years of age, with a mean of 79. As could be expected, given the trend for women to have higher life expectancies than men (Hooyman & Kiyak, 1999), female respondents (N=503) outnumbered male respondents (N=294) in the study sample. All respondents in

the initial wave of the original study were Caucasian. In line with current national demographics, men (76%) were twice as likely as women (38%) to be currently married, and women were considerably more likely to report being previously married (59%) (e.g., divorced; or most frequently, widowed) than were the male respondents (21%), and over twice as likely as males (26%) to be living alone (59%). The sample for this study was relatively well educated, with a mean educational level of almost 14 years (SD 2.54). Women reported slightly less education (mean = 13 years) than men (mean=14 years). The median level of financial assets for the sample ranged from \$150,000 - \$175,000, with women reporting mean levels below the median (\$125,000) and males reporting mean levels above the median level (\$175,000-\$199,000) of total financial assets. Table 4 summarizes comparisons between respondents included in initial data analyses (N = 797), respondents who were excluded due to missing data (N = 202), respondents lost to attrition (N = 536), and respondents included in the final study sample (N = 255). Table 5 explores possible gender differences in the measures used in the study.

Table 4

*Comparison of the Characteristics of Study Participants with Respondents Who Were Excluded Due to Missing Data or Lost to Attrition*

<b>Characteristic</b>	<b>Sample Population at Time 1 (N = 797)</b>	<b>Excluded Due to Missing Data (N = 202)</b>	<b>Cases Lost to Attrition (N = 536)</b>	<b>Final Sample (N = 255)</b>
	Mean (SD) or <i>n</i> (%)	Mean (SD) or <i>n</i> (%)	Mean (SD) or <i>n</i> (%)	Mean (SD) or <i>n</i> (%)
<u>Age</u>	78.6 (4.17)	82.2 (5.12)	79.3 (4.34)	77.2 (3.42)
<75	117 (14.7)	18 (9.0)	61 (11.4)	55 (21.6)
75-79	365 (45.1)	53 (26.4)	221 (41.2)	142 (55.7)
80-84	250 (31.4)	62 (31.0)	195 (36.4)	52 (20.4)
85+	65 (8.6)	69 (38.8)	59 (11.0)	6 (2.4)
<u>Gender</u>				
Male	294 (36.9)	48 (23.8)	205 (38.2)	89 (34.9)
Female	503 (63.1)	154 (76.2)	331 (62.0)	166 (65.1)
<u>Race (White)</u>	797 (100.0)	202 (100.0)	536 (100.0)	255 (100.0)
<u>Education</u>	13.6 (2.54)	13.4 (2.70)	13.5 (2.58)	13.7 (3.42)
<12 years	93 (11.7)	36 (12.8)	70 (13.1)	23 (9.0)
12 years	218 (27.3)	59 (29.2)	139 (26.0)	77 (30.2)
>12 years	486 (61.0)	107 (45.5)	327 (60.0)	155 (60.8)
<u>Marital Status</u>				
Never Married	18 (2.3)	23 (11.4)	9 (1.7)	8 (3.1)
Married	417 (52.3)	55 (27.2)	274 (51.1)	139 (54.5)
Previously Married	362 (45.4)	124 (61.4)	253 (47.2)	108 (42.3)

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Table 4 (Continued)

*Comparison of Study Participants with Respondents Who Were Excluded Due to Missing*

*Data or Who Were Lost to Attrition*

<b>Characteristic</b>	<b>Sample Population at Time 1 (N = 797)</b>	<b>Excluded Due to Missing Data (N = 202)</b>	<b>Cases Lost to Attrition (N = 536)</b>	<b>Final Sample (N = 255)</b>
	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)
<u>Living</u>				
<u>Arrangements</u>	371 (46.5)	142 (70.3)	254 (47.4)	115 (45.1)
Living Alone	426 (53.4)	60 (29.7)	282 (53.0)	140 (54.9)
Not Living Alone				
<u>Total Assets</u>	\$150K - \$175K	\$100K -	\$150K -	\$150K -
(Median)		\$124K	\$170K	\$175K
<u>Health Self</u>	3.96 (0.82)	3.96 (0.91)	3.84 (0.83)	4.20 (0.74)
<u>Appraisal</u>	2 (0.2)	0	2 (0.4)	0
(1) Very Sick	13 (1.6)	12 (5.9)	12 (2.2)	1 (0.4)
(2) Sick	232 (29.1)	51 (25.2)	183 (34.1)	48 (18.8)
(3) Fairly	320 (40.1)	72 (35.6)	209 (39.0)	108 (42.3)
Healthy	230 (28.9)	67 (33.2)	130	98
(4) Healthy			(24.2)	(38.4)
(5) Very Healthy				
<u>Chronic Conditions</u>	2.33 (1.62)	2.50 (1.88)	2.37 (1.63)	1.96 (1.53)
0	96 (12.0)	26 (12.9)	61 (11.4)	44 (17.2)
1	180 (22.5)	41 (20.3)	123 (23.0)	71 (28.0)
2	183 (23.0)	46 (22.8)	119 (22.2)	58 (23.0)
3	164 (21.0)	36 (17.8)	113 (21.1)	37 (14.5)
4	85 (10.7)	29 (14.4)	58 (10.8)	31 (12.2)
5	60 (7.5)	9 (4.5)	40 (7.5)	9 (3.5)
6	18 (2.3)	8 (4.0)	14 (2.6)	2 (0.8)
7	10 (1.2)	3 (1.5)	7 (1.3)	3 (1.2)
8	0	1 (0.5)	1 (0.2)	0
9	0	3 (1.5)	0	0

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Table 4 (Continued)

*Comparison of Study Participants with Respondents Who Were Excluded Due to Missing*

*Data or Who Were Lost to Attrition*

<b>Characteristic</b>	<b>Sample Population at Time 1 (N = 797)</b>	<b>Excluded Due to Missing Data (N = 202)</b>	<b>Cases Lost to Attrition (N = 536)</b>	<b>Final Sample (N = 255)</b>
	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)
<u>Baseline ADLs</u> (Mean item score)	1.04 (0.23)	1.08 (0.28)	1.06 (0.27)	1.02 (0.12)
<u>Baseline IADLs</u> (Mean item score)	1.13 (0.41)	1.29 (0.59)	1.17 (0.47)	1.07 (0.25)
<u>Baseline Affect Scores</u>	16.00 (3.80)	14.89 (3.78)	15.77 (3.82)	16.54 (3.69)
Positive Affect	8.49 (3.14)	8.03 (3.52)	8.49 (3.12)	8.47 (3.18)
Negative Affect				
<u>Baseline CESD</u>	6.95 (4.91)	6.71 (6.67)	7.19 (4.93)	6.46 (4.85)
<u>Baseline Life Satisfaction</u>	18.73 (3.28)	17.51 (3.74)	18.56 (3.22)	19.11 (3.39)
<u>Religious Preference</u>				
Protestant	532 (66.7)	149 (73.8)	358 (66.8)	170 (66.7)
Catholic	177 (22.2)	27 (13.4)	125 (23.3)	51 (20.0)
Jewish	49 (6.1)	7 (3.5)	27 (5.0)	22 (8.6)
Other	11 (1.3)	6 (3.0)	5 (1.0)	5 (2.0)
None	28 (3.5)	13 (6.4)	21 (3.92)	7 (2.7)

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Table 4 (Continued)

*Comparison of Study Participants with Respondents Who Were Excluded Due to Missing*

*Data or Who Were Lost to Attrition*

<b>Characteristic</b>	<b>Sample Population at Time 1 (N = 797)</b>	<b>Excluded Due to Missing Data (N = 202)</b>	<b>Cases Lost to Attrition (N = 536)</b>	<b>Final Sample (N = 255)</b>
	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)
<u>Religious</u>	4.2 (2.42)	3.1 (2.75)	4.0 (2.45)	4.7 (2.21)
<u>Attendance</u>	108 (13.5)	69 (34.3)	84 (15.8)	24 (9.4)
0) Never	51 (6.4)	10 (5.0)	41 (7.7)	10 (3.9)
1) < 1 time per year	66 (8.7)	18 (9.0)	46 (8.6)	18 (7.1)
2) 1 -2 times per year	67 (8.4)	10 (5.0)	51 (9.6)	15 (5.9)
	30 (3.7)	6 (3.0)	22 (4.1)	8 (3.1)
3) Several times per year	55 (6.9)	8 (4.0)	28 (5.2)	8 (3.1)
	347 (43.5)	69 (34.3)	228 (42.8)	27 (10.6)
4) 1 time per month	62 (7.7)	10 (5.0)	33 (6.2)	116 (45.5)
5) 2-3 times per month	11 (1.3)	1 (0.5)	0	29 (11.4)
	0	1	3	0
6) Every week				
7) Several times per week				
8) Every day				
Missing				
<u>How Religious</u>	3.6 (0.98)	3.5 (1.04)	3.5 (1.00)	3.6 (1.00)
1) Not at all	29 (3.6)	12 (6.1)	18 (3.4)	11 (4.3)
2) Not very	73 (9.1)	22 (11.1)	54 (10.1)	19 (7.4)
3) Somewhat	224 (28.1)	47 (23.7)	151 (28.2)	71 (27.8)
4) Religious	345 (43.2)	93 (47.0)	231 (43.1)	110 (43.1)
5) Very Religious	126 (15.8)	24 (12.1)	82 (15.3)	44 (17.2)
Missing	0	4	0	0

Table 5

*Gender Differences in Descriptive Characteristics of Sample at Baseline (N = 797)*

	Women (N = 503)		Men (N = 294)		
<b>Sociodemographic Characteristic</b>	<b>Mean or n</b>	<b>(SD) (%)</b>	<b>Mean or n</b>	<b>(SD) (%)</b>	<b>Chi Sq (df)</b>
Age (yrs)	78.31	(3.99)	79.12	(4.42)	
Marital status					109.79 (2) **
Never married	11	(2.1)	7	(2.3)	
Married	193	(38.3)	224	(76.1)	
Previously married	299	(59.4)	63	(21.4)	
Living arrangements					82.88 (1) **
Alone	296	(58.8)	75	(25.5)	
<b>One -Way ANOVA Results</b>					<b>F</b>
Education (years)	13.3	(2.29)	14.0	(2.88)	
Total financial assets	\$125 – 150K		\$175-199K		
<b>Physical and Functional Health</b>	<b>Mean</b>	<b>(SD)</b>	<b>Mean</b>	<b>(SD)</b>	<b>F</b>
Self Appraisal of Health	3.96	(0.84)	3.95	(0.77)	0.05
Chronic conditions	2.43	(1.65)	2.18	(0.77)	4.67*
IADLs	1.17	(0.45)	1.08	(0.32)	8.12*
ADLs	1.05	(0.27)	1.02	(0.15)	3.76
<b>Psychological Wellbeing Characteristics</b>	<b>Mean</b>	<b>(SD)</b>	<b>Mean</b>	<b>(SD)</b>	<b>F</b>
Negative Affect (NA)	8.98	(3.38)	7.66	(2.45)	34.03*
Positive Affect (PA)	16.34	(3.71)	15.41	(3.88)	11.19*
Satisfaction w/ Life (SWLS)	18.45	(3.49)	19.22	(2.83)	10.17*
Depressive symptomatology	7.62	(5.16)	5.82	(4.20)	25.69*
		Women (N = 503)		Men (N = 294)	
<b>Religiosity Variables</b>	<b>Mean</b>	<b>(SD)</b>	<b>Mean</b>	<b>(SD)</b>	<b>F</b>
How Religious	3.71	(0.95)	3.37	(0.99)	25.53*
Religious Attendance	4.40	(2.41)	3.97	(2.40)	5.93*
Religious Activities	1.51	(0.79)	1.42	(0.74)	2.69
Seek God's Help	4.17	(1.14)	3.55	(1.37)	47.05*
Trust in God	4.21	(1.09)	3.75	(1.27)	29.11*
Find Comfort in Religion	3.95	(1.22)	3.33	(1.40)	42.68*

\* Indicates statistical significance at  $p \leq .05$ .\*\* Indicates statistical significance at  $p < .001$



### *Physical Health and Function*

As can be seen in Table 4, the study population was generally healthy. With regard to physical health and function, respondents reported moderate levels of self-appraised health, with an overall mean score for the sample of 3.96 on a five-point scale. Over 69% of the sample indicated that they considered themselves healthy to very healthy. A list of 20 physical conditions from the OARS index of chronic conditions was used to ascertain the level of chronic disease or number of physical ailments each respondent was burdened with at baseline. The mean number of chronic conditions reported was 2.33 (SD 1.62), with women reporting slightly higher numbers of conditions (mean = 2.43) than males (mean = 2.18). Arthritis was the most common condition reported, with almost 54 % of the sample indicating that they were living with the condition, followed by approximately 33 % reporting high blood pressure. The sample reported relatively low levels of functional disability, as evidenced by low mean item totals for both Instrumental Activities of Daily Living (IADLs) (M = 1.13, SD = 0.41) and Activities of Daily Living (ADLs) (M = 1.04, SD = 0.23). Item scores for each of the scales ranged from 1 – 4, with higher scores indicating greater levels of disability. Mean levels of physical disability were similar for male and female respondents.

### *Psychological Well-being*

Table 4 includes a summary of the measures of psychological well-being utilized in the study. At baseline, study participants reported moderate mean levels of positive affect (16.0) and satisfaction with life (18.7), both of which had total response ranges between 5 and 25. Women reported higher levels of positive affect (PA) (16.3) than

males (15.4), but lower levels (18.4) of life satisfaction in comparison to males (19.2). Mean scores for negative affect (NA) for the sample were 8.4, with women reporting higher levels (8.9) as compared to men (7.6). Depressive symptomatology was measured with a revised, shortened version of the CES-D. As previously explained, once response categories were recoded and reversed as appropriate, a sum score was created to form the measure of depressive symptomatology in the current study. Overall, the study population reported a mean level of depressive symptomatology of 6.9 at baseline, with women (7.6) reporting somewhat higher mean scores than men (5.8). Values for depressive symptomatology ranged from 0.00 – 27.00 on a scale with a total possible score of 33.

### *Religiosity*

As Table 4 shows, a majority of the respondents identified themselves as Protestant (67%). Just over 22% identified their religious preference as Catholic. Of the remaining participants, 6% reported their religious preference as Jewish while 4% indicated no preference. Respondents were asked to assess how religious they considered themselves. Using a Likert scale to measure their response, with higher scores indicating higher self-assessment of religiosity, over half of the sample (59%) indicated that they regard themselves as religious or very religious. Women (19%) were twice as likely as men (10%) to identify themselves as very religious (see Table 5). A fairly large proportion (28%) regarded themselves to be somewhat religious. In contrast, a very small proportion (4%) indicated that they were either not at all religious or not very religious (9%). Regarding attendance at religious services over the past year, respondents

most commonly reported weekly attendance (43%), with women appearing more likely to attend weekly (46%) than men (40%). More infrequent attendance (e.g., 1 – 12 times per year) was reported by slightly more than 34% of the sample. More frequent attendance was reported by less than 10% of the participants. The remaining subjects (13%) indicated that they had not attended religious services in the previous year.

#### *Subjects Excluded Due to Missing Data at Baseline*

Respondents who did not have complete data at baseline were flagged during initial analyses for comparison with those who did have complete data as well as the final study sample and the group of respondents who were lost to attrition. Baseline characteristics of excluded respondents at baseline are summarized and compared with the other groups in Table 4. The group of respondents excluded due to missing data had a mean age of 82.2 years, higher than both the study sample and the group lost to attrition. Over three quarters of the group was female (76%), a majority of whom were previously married (61%) and living alone. Respondents in this sample reported similar educational levels to the other samples, but lower total assets than those respondents in the other groups. Of all the groups compared for analyses, they reported the greatest number of chronic conditions, highest mean levels of functional difficulties, lowest levels of positive affect and lowest levels of life satisfaction. The excluded group also reported the lowest levels of religiosity among the groups who were compared.

One way ANOVAs were computed to determine if there were significant differences between the study sample and the excluded sample on baseline measures of the covariates and the independent variable. As Table 6 indicates, there were significant differences between the two groups on only three of the measures. Those respondents

excluded from analysis at baseline tended to report significantly lower levels of positive affect and life satisfaction, and higher levels of IADL difficulties. There was no significant evidence that those who were excluded from the study due to missing data had higher levels of depressive symptomatology, a more negative appraisal of their health, greater negative affect, or more chronic illness than those who provided more complete data at the baseline interview.

Table 6

*ANOVA Results Summarizing Group Differences in Measures Between Included Sample Population and Cases Excluded Due to Missing Data and Between Study Participants and Respondents Who Were Lost to Attrition*

Variable	Time 1 Sample Population (N = 797)	Time 1 Excluded Cases (N = 202)	Model F	Cases Lost to Attrition (N = 536)	Final Sample (N = 255)	Model F
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Health Self Appraisal	3.96 (0.82)	3.96 (0.91)	0.00	3.84 (0.83)	4.20 (0.74)	31.65*
Chronic Conditions	2.33 (1.62)	2.50 (1.88)	1.58	2.37 (1.63)	1.96 (1.53)	11.54*
Baseline ADLs (Mean item score)	1.04 (0.23)	1.08 (0.28)	3.12	1.06 (0.27)	1.02 (0.12)	4.82*
Baseline IADLs (Mean item score)	1.13 (0.41)	1.29 (0.59)	18.91*	1.17 (0.47)	1.07 (0.25)	9.78*
Baseline CESD	6.95 (4.91)	6.71 (6.67)	0.02	7.19 (4.93)	6.46 (4.85)	3.80
Baseline Positive Affect	16.00 (3.80)	14.89 (3.78)	13.76*	15.77 (3.82)	16.54 (3.69)	7.22*
Baseline Negative Affect	8.49 (3.13)	8.03 (3.52)	3.24	8.49 (3.12)	8.47 (3.18)	0.01
Baseline Life Satisfaction	18.73 (3.28)	17.51 (3.74)	21.17*	18.56 (3.22)	19.11 (3.39)	4.84*

*Continued on next page*

Table 6 (Continued)

*ANOVA Results Summarizing Group Differences in Measures Between Included Sample Population and Cases Excluded Due to Missing Data and Between Study Participants and Respondents Who Were Lost to Attrition*

Variable	Time 1 Sample Population (N = 797)	Time 1 Excluded Cases (N = 202)	Model F	Cases Lost to Attrition (N = 536)	Final Sample (N = 255)	Model F
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
<b>Religiosity Measures</b>						
Religiosity	3.50 (1.04)	3.24 (1.15)	9.90*	3.42 (1.04)	3.64 (1.01)	7.51*
How Religious	1.56 (1.10)	1.61 (1.32)	0.28	3.57 (0.98)	3.62 (0.97)	0.39
Attendance	4.24 (2.42)	3.14 (2.75)	31.40*	3.96 (2.45)	4.68 (2.21)	15.53*
Religious Activities	1.48 (0.77)	1.31 (0.63)	8.71*	1.43 (0.73)	1.58 (0.85)	6.66*
Seek God's Help	3.95 (1.27)	3.84 (1.38)	0.97	3.90 (1.28)	4.03 (1.23)	1.76
Trust in God	4.04 (1.18)	3.97 (1.31)	0.50	4.01 (1.19)	4.10 (1.74)	0.85
Comfort in Religion	3.72 (1.32)	3.71 (1.38)	0.02	3.66 (1.35)	3.85 (1.26)	3.43

\* Indicates statistical significance at  $p \leq .05$ .

Table 6 includes results of one way ANOVAs computed to explore differences between the study sample and excluded sample on religiosity measures. Analyses indicated that there were significant differences in mean levels of overall religiosity, religious attendance and participation in religious activities. Respondents excluded due to missing data at baseline reported significantly lower levels of religiosity, attendance at religious services and participation in religious activities. However, there were no significant differences between the groups in self appraisal of religiousness, nor in respondents' reported ability to trust in God, find comfort in religion or their tendency to seek God's help in stressful situations.

#### *Exploring the Implications of Attrition*

As noted earlier, the original study began with 1000 adults at baseline. Not surprisingly, the study population was significantly effected by attrition. The number of participants completing interviews at Time 5 fell to 591, and only 366 respondents completed interviews at Time 10. In order to be included in the final sample for the current study, respondents were required to have complete (or minimally missing) data for all time points. To explore potential implications of participant attrition on study outcomes, baseline characteristics of respondents who were interviewed at each of the three time points were compared with those of respondents who had complete data at baseline but were missing data for one or both of the subsequent time points. This group of respondents was considered to be lost to attrition. The group of respondents who were lost to attrition (N=703) had a mean age of 80.2 years. Over one half of the sample was female (65%), previously married (51%) and lived alone at the baseline interview. They were similar to the study population in relation to median level of assets (\$150K-175K),

and mean number of chronic conditions (2.38). Table 4 summarizes group characteristics for respondents lost to attrition and compares them to those respondents included in the final study sample and those excluded due to excessive missing data at baseline.

One way ANOVAs were computed to determine whether the group lost to attrition differed significantly from the final study sample on measures of health self-image, positive and negative affect, life satisfaction, depressive symptomatology, or functional ability. With the exception of negative affect and depressive symptomatology, significant differences between the groups were found for each of these variables (all  $F$ s  $>1$ ,  $p \leq .05$ ). Respondents lost to attrition were significantly more likely to report lower levels of health self-image, positive affect, and life satisfaction, and higher levels of functional disability. But there was no significant evidence that respondents lost to attrition had greater levels of depressive symptomatology or a more negative outlook on life. The ANOVA summary results are presented in Table 6.

There were also significant differences between the respondents lost to attrition and those included in the final study sample related to the religiosity measures. in Table 4 it can be seen that, compared to the final study sample, the respondents lost to attrition reported significantly lower levels of overall religiosity, religious attendance, religious activity, ability to find comfort in religion, and were less likely to seek God's help in times of stress. They did not differ significantly, however, in how religious they considered themselves or in their ability to trust in God.



### *Comparing the Study Sample to the Elderly Population of Florida*

Examination of census data (U. S. Department of Health and Human Services, 2005) indicates that the study population for this research differs in many ways from the elderly population of Florida in general. Many of the differences can be attributed to the original study inclusion criteria that required subjects to be residents of a middle-to-upper socioeconomic class, deed-restricted retirement community, to be in good health and to be free of mental and physical infirmities that would prohibit participation in a lengthy interview. However, principle investigators noted at the outset that their study sample did reflect both the general community from which it was drawn and the elderly retirement population of Florida in general. Table 7 provides a summary of selected differences between the study sample and the general population of White, non-Hispanic, Florida residents over the age of 65. The White, non-Hispanic elderly population in Florida is much more evenly divided in terms of gender (male = 49%, female = 51%) than the study sample in which well over 50% of the sample is female (male = 37%, female = 63%). Further, study participants were also much more likely to live alone (47%) than other elderly Florida residents (27%), less likely to be currently married and more commonly list themselves as previously married. Study respondents appear to be more highly educated, although comparisons are difficult to interpret since the data source consulted did not have educational status delineated by specific age groups. Nevertheless, with almost 61% of the study sample reporting educational achievement greater than 12 years, it is very likely that the sample differs from the elderly Florida population in general. The study sample also appears to demonstrate some health advantages over other elderly Floridians. Respondents appear to be more likely to view

themselves as healthy or very healthy (69%) than their peers who are outside of the study, and report much lower levels of functional difficulties than the general Florida population over 65. The two populations are closer together, however, on the types and occurrence of chronic health conditions, with individuals in both groups reporting moderate to high levels of arthritis, hypertension, and heart disease.

Table 7

*Comparing the Study Sample with White, Non-Hispanic Adults Aged 65 and Over in Florida*

Characteristic	Percent	
	Study Sample (N = 797)	Florida Population (2000) (N = 2,807,597)
Gender (male)	36.8	48.8
Gender (female)	63.1	51.2
Race (White)	100	78.0
Education		
>12 years	60.9	---
Marital Status		
Never Married	2.2	3.0
Married	52.3	60.6
Previously Married	45.4	36.6
Living Arrangements		
Living Alone	46.5	26.6

Continued on next page

Table 7 (continued)

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Self Appraisal of Health		
Sick – Very Sick <sup>1</sup>	1.85	24.3
Fairly Healthy <sup>2</sup>	29.1	34.6
Healthy- Very Healthy <sup>3</sup>	68.9	41.2
ADL Difficulties		
None	93.7	38.8*
1-2 ADLs	3.3	18.2
IADL Difficulty		
None	78.5	38.8*
At least 1 IADL	8.53	13.6
Selected Chronic Conditions		
Arthritis	54.0	50.2
Hypertension	33.0	50.4
Heart Disease	24.9	33.4

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Note: <sup>1</sup> corresponds to fair to poor.

Note: <sup>2</sup> corresponds to good.

Note: <sup>3</sup> corresponds to excellent to very good.

\* Reported no ADL or IADL difficulties, but reported at least minimal physical limitations in other areas (e.g., stooping, lifting, grasping, walking distance).

### *Bivariate Analyses*

Previous research has often suggested that many of the variables commonly included in social and behavioral science studies are associated with gender. In an effort to frame findings in terms of some of the gender differences found in this study, initial analyses explored the association of gender with a number of the variables included in the analytical model. The Chi-square test of independence was used to estimate associations between the sociodemographic control variables gender, living arrangement, and marital status. The Chi-square tested the null hypothesis that in this study population gender was not significantly related to the categorical variables marital status and living arrangement. The larger the value of the Chi square, the stronger the association between the two variables in the sample being examined. The results of these analyses are presented in Table 5. As expected, gender was significantly associated with marital status and living arrangements. It has been well established in the United States that, in general, women tend to live longer than men (Hooyman & Kiyak, 1999). In light of that demographic trend, it follows that women are more likely to be widowed at higher rates, and live alone in greater numbers. The data for this sample appear to reflect this trend in that, women were half as likely to be married and more than twice as likely to live alone. In addition, to gain a more thorough description of the religious orientation of the study population, one-way ANOVAs were computed to explore the associations between gender and each of the variables that were combined to form the religiosity index. The results, which are summarized in Table 5 indicated that there were significant differences in most of the religiosity domains measured in this study. The only exception was in the number of

religious activities that respondents reported participating in. Female respondents scored significantly higher in each of the other religiosity domains.

To test the associations between gender and continuous or interval level variables to be controlled at Time 1, one-way ANOVAs were computed. The one-way ANOVAs tested the hypothesis that in the sample, there were no differences in self-appraisal of health, positive or negative affect, baseline life satisfaction levels or depressive symptomatology, IADL or ADL difficulties, or number of chronic conditions based upon gender. The results summarized in Table 5 indicate that statistically significant differences by gender were found for a number of measures. Women demonstrated higher mean levels of positive affect (16.31) than the men did (15.41) as well as higher levels of negative affect (8.98) than males (7.66). Women also reported lower levels of baseline life satisfaction (18.45) than men (19.22) in the study, and, in a finding somewhat consistent with previous studies, women also reported significantly higher levels of baseline depressive symptomatology (7.62) than did the males (5.82). There were small, but statistically significant differences in levels of physical and functional health by gender as well, with women reported slightly higher levels of IADL difficulty and greater numbers of chronic conditions than did males. However, differences between males and females with regard to ADL difficulties and self-appraisal of health failed to reach significance.

Current literature suggests that there may also be gender differences in the influence asserted by the independent variable (religiosity) included in this study. In an effort to more clearly describe the sample population and to explore the relationship between gender and the individual domains of religiosity that were combined to form the

independent variable in this study, one-way ANOVAs were computed. As summarized in Table 5, analyses revealed that gender was statistically associated with respondents' reports of how religious they viewed themselves, with females reporting higher mean levels (Mean = 3.71) of self-assessed religiosity than male respondents. There were also significant differences in attendance of religious services, with females reporting higher levels of attendance. In regards to more subjective measures of religiosity or religious belief, females reported statistically higher levels of trust in God, ability to find comfort in religion and stronger tendencies to seek God's help when faced with stressful situations. Further, to determine the association between gender and religiosity, as measured by the religiosity index, a one-way ANOVA was computed. This analysis revealed that women demonstrated statistically higher mean scores (Mean = 3.66) on the index than did the men (Mean = 3.23). These results, which demonstrated that women score significantly higher than men on measures representing multiple domains of religiosity, are similar to those found by Idler, et al. (2003) in a nationally representative sample.

Spearman correlation coefficients were computed to assess the relationships between all control variables and baseline covariates measured at interval or continuous levels. Results appear in Table 8. Results were generally as expected in terms of which variables demonstrated correlations and the direction of the correlations. However, not all correlations were significant, and many that were significant reflected only weak associations (e.g., .01 to .11). In general, the strongest associations were demonstrated among variables related to emotional and psychological well-being (e.g., positive affect, negative affect, life satisfaction, depressive symptomatology). Respondent age was

negatively associated with negative affect and positive affect at significant levels, and positively with IADLs, indicating that as study respondents increased in age, they were more likely to report higher levels of negative affect and IADL difficulties and lower levels of positive affect. Education was significantly associated with total assets and positive affect. Not surprisingly, total assets were positively associated at significant levels with life satisfaction, but negatively associated with negative affect, depressive symptomatology, IADLs, and number of chronic conditions. These results are in line with numerous studies that have demonstrated that individuals with greater socioeconomic resources tend to report higher levels of life satisfaction and positive affect, and are somewhat more likely to report greater levels of negative affect, depressive symptomatology, functional difficulties and health issues.

As was anticipated, health and function variables were correlated with a large number of variables in the study. Health self-appraisal was negatively correlated with negative affect, depressive symptomatology, IADLs, ADLs, and chronic conditions, but positively correlated with positive affect and life satisfaction. These relationships indicate that those respondents with lower levels of negative affect, depressive symptomatology, IADL and ADL difficulties, are more likely to view themselves as healthier. In addition to correlations with age and health self-image, IADLs were also correlated significantly with negative affect, life satisfaction, depressive symptomatology, ADLs and chronic conditions. These results indicate that those respondents reporting greater levels of IADL difficulties were more likely to be older, report higher levels of negative affect, depressive symptomatology, ADL difficulties, more chronic conditions and lower levels of life satisfaction. ADLs, although less



strongly associated with age than IADLs, were also significantly correlated with negative affect, depressive symptomatology, and chronic conditions. Surprisingly, they were not significantly correlated with life satisfaction, which may reflect the fact that the study sample reported low levels of ADL difficulties at baseline.

In regard to measures of emotional and psychological well-being, as anticipated, positive affect was significantly and positively correlated with education, health self-image, life satisfaction, and religiosity, but negatively correlated with age and depressive symptomatology. Whereas negative affect was significantly and negatively related to age, assets, health self-image, positive affect, and life satisfaction, but positively correlated with depressive symptomatology, IADLs, ADLs, and number of chronic conditions. Thus, respondents reporting greater levels of negative affect were more likely to be older, report fewer total assets, lower health self-image, positive affect and life satisfaction, but higher levels of depressive symptomatology, functional difficulties and chronic conditions. Depressive symptomatology was significantly and negatively correlated with assets, health self-image, positive affect, life satisfaction, and religiosity, but positively correlated with negative affect, IADLs, ADLs, and number of chronic conditions. Life satisfaction was also significantly correlated with a large number of the controls and other covariates in the study. Total assets, health self-appraisal, positive affect, and religiosity were positively correlated with life satisfaction, whereas, negative affect, depressive symptomatology, IADLs and chronic conditions were negatively correlated. These results indicate that respondents reporting higher levels of life satisfaction were more likely to report greater total assets, higher levels of positive affect and religiosity (independent variable), view themselves as healthier, and report lower

levels of negative affect, depressive symptomatology, functional difficulties, and chronic conditions.

*Relationships between the Control Variables, Covariates, Optimism, Time 10 Life Satisfaction and Time 10 Depressive Symptomatology*

Based upon the conceptual model developed to guide this study, sociodemographic characteristics and covariates measured at baseline were expected to be significantly correlated with the independent variable (religiosity), with Time 5 optimism (mediator), and with Time 10 life satisfaction and Time 10 depressive symptomatology (dependent variables). In addition, it was hypothesized that Time 5 optimism (mediator) would be significantly associated with the religiosity (independent variable), and with Time 10 life satisfaction and Time 10 depressive symptomatology (dependent variables). Correlational analyses were computed to assess the strength of association of interval or continuous level control variables and covariates with the hypothesized independent variable (religiosity), mediator (optimism) and dependent variables (Time 10 life satisfaction, Time 10 depressive symptomatology), as well as between the religiosity (independent variable) and optimism (mediator), and between optimism and the dependent variables. Results are presented in Table 9. Correlational analyses revealed that, of the sociodemographic control variables, total assets had a significant relationship with both Time 10 life satisfaction and Time 10 depressive symptomatology (dependent variables), but not with optimism (mediator). Respondent age and level of education were not significantly associated with the mediating variable

Table 8  
*Correlations Between Sociodemographic Variables, Covariates, and the Religiosity at Baseline (N = 797)*

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	1.00	-.02	.04	.02	-.11*	-.14*	.04	-.01	-.04	.07*	.05	-.01
2. Education	-.02	1.00	.15*	.01	-.02	.09*	-.02	-.03	-.04	.04	.05	-.01
3. Assets	.04	.15*	1.00	.04	-.08*	.02	.11*	-.12*	-.03	-.08*	-.05	-.12*
4. Health Self-Appraisal	.02	.01	.04	1.00	-.18*	.17*	.21*	-.29*	.06	-.28*	-.13*	-.41*
5. NA1	-.11*	-.02	-.08*	-.18*	1.00	-.01	-.33*	.52*	.02	.16*	.09*	.20*
6. PA1	-.14*	.09*	.02	.17*	-.01	1.00	.19*	-.30*	.20*	-.04	-.04	-.05
7. SWLS1	.04	-.02	.11*	.21*	-.33*	.19*	1.00	-.45*	.10*	-.09*	-.05	-.20*
8. Depressive Symptomatology	-.01	-.02	-.12*	-.29*	.52*	-.30*	-.45*	1.00	-.10*	.20*	.08*	.22*
9. Religiosity	-.04	-.04	-.03	.06	.02	.20*	.11*	-.10*	1.00	-.04	-.04	-.04
10. IADLs	.08*	.04	-.08*	-.28*	.16*	-.04	-.09*	.20*	-.04	1.00	.54*	.32*
11. ADLs	.05	.05	-.05	-.13*	.09*	-.04	-.05	.08*	-.04	.54*	1.00	.22*
12. Chronic Conditions	-.01	-.01	-.12*	-.41*	.20*	-.05	-.20*	.22*	-.04	.32*	.22	1.00

\* Indicates statistical significance at  $p \leq .05$

or with either of the dependent variables. As expected, however, there were significant positive associations between optimism and the covariates health self-image (0.32), positive affect (0.23), baseline life satisfaction (0.26). There a significant positive association between the independent variable (religiosity) and optimism (0.17), although it was surprisingly weak. Also expected were the significant negative relationships demonstrated between Time 5 optimism and baseline measures of negative affect (-0.20), and depressive symptomatology (-0.36). Thus, respondents who reported a more positive health self-image, greater positive affect, and higher levels of life satisfaction at baseline also tended to report higher levels of optimism at Time 5. Additionally, respondents who reported higher levels of religiosity (independent variable) at baseline also tended to report higher levels of optimism at Time 5. Surprisingly, optimism was not significantly associated with chronic conditions or IADL difficulties, both of which one might expect to challenge an individual's ability to remain optimistic or hopeful about the future. Optimism was, however, significantly associated with both Time 10 depressive symptomatology (-0.36) and Time 10 life satisfaction (0.41), indicating that those respondents who reported greater depressive symptomatology at Time 10 were more likely to have reported lower levels of optimism at Time 5.

Depressive symptomatology at Time 10 was positively correlated at significant levels with baseline measures of negative affect (0.41), depressive symptomatology (0.47), IADLs (0.15) and chronic conditions (0.16), indicating that respondents who reported higher levels of depressive symptomatology at Time 10 were more likely to have reported higher levels of negative affect, depressive symptomatology, IADL difficulties and chronic conditions at baseline. Significant negative correlations were

found between baseline depressive symptomatology, health self-image (-0.31), positive affect (-0.20), and life satisfaction (-0.30).

Time 10 life satisfaction demonstrated significant relationships with the greatest number of baseline variables. Life satisfaction was positively associated with baseline measures of health self-image (0.23), positive affect (0.26), and life satisfaction (0.48), as well as religiosity (independent variable) (0.23). Significant negative associations were found between Time 10 life satisfaction and baseline negative affect (-0.27), depressive symptomatology (-0.37), IADLs (-0.13), ADLs (-0.14), and chronic conditions (-0.15). Thus, respondents who reported higher levels of life satisfaction at Time 10, tended to have reported higher levels of baseline health self-image and life satisfaction, fewer functional difficulties, lower depressive symptomatology, more positive mood, and greater religiosity at baseline.

Correlations were also computed to test the relationship between the two dependent variables, Time 10 depressive symptomatology and Time 10 life satisfaction. The results indicated that these were the most strongly correlated study variables (-0.52), demonstrating that higher life satisfaction was associated with lower levels of depressive symptomatology.

Table 9

*Correlations Between Control Variables, Covariates, Optimism, Time 10 Life Satisfaction and Time 10 Depressive Symptomatology**(N = 255)*

Variable (Baseline)	Time 5 Optimism (Mediator)	Time 10 Life Satisfaction (Dependent Variable)	Time 10 Depressive Symptomatology (Dependent Variable)
<b>Sociodemographic Controls</b>			
Age	-.002	.003	.11
Education	-.11	-.06	-.07
Assets	.06	.15*	-.12*
<b>Covariates</b>			
Health self-appraisal	.32*	.23*	-.31*
Negative affect	-.20*	-.27*	.41*
Positive affect	.23*	.26*	-.20*
Life satisfaction	.26*	.48*	-.30*
Depressive symptomatology	-.36*	-.37*	.47*
IADLs	-.10	-.13*	.15
ADLs	-.12	-.14*	.11
Chronic conditions	-.11	-.15*	.16
<b>Independent Variable</b>			
Religiosity	.17*	.23*	-.07
<b>Mediating Variable</b>			
Time 5 Optimism	1.00	.41*	-.36*
<b>Dependent Variables</b>			
T10 Life satisfaction	.41*	1.00	-.52*
T10 Depressive symptomatology	-.36*	-.52*	1.00

Note: (Sample N includes respondents who participated at Time 1, Time 5, and Time 10)

\* = &lt; .05

One-way ANOVAs were also computed to assess the associations between the categorical control variables gender, marital status and living arrangement, and optimism (mediator), Time 10 life satisfaction and Time 10 depressive symptomatology (dependent variables). Results are summarized in Table 10. No significant differences in levels of optimism were found based on gender, marital status, or living arrangement. Not surprisingly, however, significant differences in mean levels of optimism, Time 10 life satisfaction, and Time 10 depressive symptomatology were associated with all three of these sociodemographic variables. Males were found to have higher levels of life satisfaction and lower levels of depressive symptomatology than female respondents. Married respondents were more likely to report higher levels of life satisfaction and lower levels of depressive symptomatology. In addition, respondents who indicated that they did not live alone at baseline reported significantly higher levels of life satisfaction and lower levels of depressive symptomatology at Time 10.

Table 10

*Summary of ANOVA Results Assessing the Associations between Categorical Sociodemographic Control Variables, Optimism, Time 10 Life Satisfaction and Time 10 Depressive Symptomatology (N = 255)*

	<b>Optimism (Mediator)</b>			<b>Life Satisfaction (Dependent Variable)</b>			<b>Depressive Symptomatology (Dependent Variable)</b>		
	<i>Mean</i>	<i>(SD)</i>	<i>F</i>	<i>Mean</i>	<i>(SD)</i>	<i>F</i>	<i>Mean</i>	<i>(SD)</i>	<i>F</i>
<b><u>Gender</u></b>									
Male	22.16	(2.33)	0.00	19.36	(3.60)	5.34*	8.34	(5.68)	9.57*
Female	22.16	(2.44)		18.27	(3.59)		10.62	(5.60)	
<b><u>Marital Status</u></b>									
Never married	20.25	(2.96)	1.65	16.25	(4.80)	6.16*	10.89	(7.77)	4.79*
Married	22.29	(2.32)		19.30	(3.51)		8.82	(5.31)	
Previously married	22.09	(2.43)		17.97	(3.52)		11.04	(5.90)	
<b><u>Living Arrangement</u></b>									
Alone	22.00	(2.48)	1.03	17.90	(3.64)	9.03*	11.10	(5.98)	10.89*
Not alone	22.30	(2.32)		19.25	(3.52)		8.79	(5.93)	

Note: (Sample N of respondents who participated at Time 1, Time 5, and Time 10)

\* Indicates statistical significance at  $p < .05$



## *Multivariate Analysis*

### *Overview*

This study addressed two major hypotheses: (1) Religiosity is associated with subjective well-being in elderly adults, after controlling for sociodemographic factors, and baseline measures of physical health and function, positive and negative affect, depressive symptomatology, and life satisfaction; (2) The association between religiosity and subjective well-being in elderly adults is mediated by optimism after controlling for sociodemographic factors, and baseline measures of physical health and function, positive and negative affect, depressive symptomatology, and life satisfaction. For each hypothesis, subjective well-being at Time 10 was operationalized with the use of two measures:

1. Time 10 depressive symptomatology, as measured by a revised version of the Center for Epidemiologic Study of Depression (CES-D);
2. Time 10 life satisfaction, as measured by the Satisfaction with Life Scale (SWLS).

The multivariate model building process was informed by research strategies outlined by Baron and Kenny (1986) and guided by the conceptual graphic included in Chapter 1. Utilizing the hierarchical regression strategy summarized in Figure 8, a series of steps were built upon one another to create the final regression model. Step 1 was a two-part process in which each of the dependent variables (Time 10 depressive symptomatology, Time 10 life satisfaction) was first regressed on the control variables that had been entered as a block, then regressed on the block of control variables with the

covariates added to the model individually. To explore the association between the independent variable (Time 1 religiosity) and the dependent variables, Step 2 involved regressing the dependent variables on the independent variable. At Step 3, each of the dependent variables was regressed on the mediator (Time 5 optimism). Step 4 assessed the predicted relationship between the mediator (optimism) and the independent variable (religiosity). Since it was predicted that religiosity at Time 1 would predict optimism scores at Time 5, optimism was regressed on religiosity. For Step 5, the dependent variables were regressed on a linear combination of the control variables, the covariates, and the independent variable (religiosity). To assess the proposed mediational relationship between optimism and the dependent variables, Step 6 entailed adding optimism to models in which the dependent variables were regressed on the controls, covariates, and independent (religiosity) variable. Each of these steps, and the results they generated, are discussed in the following sections.

Step	Variables Included in Model
1. Regression of dependent variables on:	a) Control variables as a block b) Control variables (block) + covariates (sequenced)
2. Regression of optimism (mediator) on:	Religiosity (independent variable)
3. Regression of dependent variables on:	Control variables (block) + covariates (block) + religiosity (independent variable)
4. Regression of dependent variables on:	Control variables (block) + covariates (block) + religiosity + optimism (mediator)

*Figure 9.* Steps in Building the Hierarchical Regression Model Predicting Time 10

Depressive Symptomatology and Life Satisfaction

### *Regression Diagnostics*

The effects of outliers on the regression line were explored through inspection of residuals (RStudent), influence (Cook's D), leverage (hat values), diffits, and effects on specific parameter estimates (dfbetas). An outlier is an unusual or distinctly different data point that is distinct from other data points (Pedhazur & Schmelkin, 1997). Outliers may result from a number of situations including, input errors, measurement errors, poor instrumentations, to name a few. However, outliers may also occur in the absence of errors (Pedhazur, 1997) and may not necessarily warrant deletion from the dataset. Examination of residual plots indicated relatively normal distribution, absent of nonlinear or heteroscedastic patterns. Criteria for extreme influence included, cases with a Cook's D greater than 1 or cases that demonstrated two or more of the following: a) a hat value > twice the mean hat value for the sample; b) an RStudent >3; c) a DFBETA >2; or d) a DFFITS >  $2(\sqrt{k/n})$ . There were no cases that met these criteria.

Collinearity diagnostics indicated that the overlap of variables in the model was considerably less than the 80% identified by Pedhazur and Schmelkin (1997) as problematic. Tolerance estimates for the independent variables were greater than 0.2. Variance inflation factor estimates all fell under 0.4. Thus, no variables were removed from the model due to multicollinearity effects.

### *Building the Regression Model*

For Step 1, each of the dependent variables, Time 10 depressive symptomatology and Time 10 life satisfaction, were regressed on the linear combination of the seven control variables. A summary of the results is provided in Table 11 . When entered as a

block, the control variables accounted for approximately 19 % of the observed variance in Time 10 depressive symptomatology ( $F[7, 247] = 8.07, p < .01, \text{adjusted } R^2 = .16$ ). The block of control variables accounted for approximately 15% of the observed variance in Time 10 life satisfaction ( $F[7, 247] = 6.48, p < .05, \text{adjusted } R^2 = .13$ ). Results for Step 1 indicate that the control variables alone account for a moderate proportion of the total variance observed in the dependent variables. All associations were in the expected direction and were consistent with bivariate statistical results. Also consistent with previous literature, health self-image ( $b = -2.67, t = -5.98, p < .05$ ), gender ( $b = 1.57, t = 2.10, p < .05$ ) and living arrangements ( $b = 2.21, t = 2.20, p < .05$ ) appear to contribute the most to the explanation of the variance in Time 10 depressive symptomatology. The parameter estimates ( $b$ ) for all three of the variables were significant at the  $p < .05$  level. Health self-appraisal also contributed significantly ( $b = 1.50, t = 5.20, p < .001$ ) to the explanation of Time 10 life satisfaction, as did living status. Living alone was negatively associated with life satisfaction ( $b = -1.65, t = -2.55, p < .05$ ), whereas higher levels of health self-appraisal were predictive of higher levels of Time 10 life satisfaction. Somewhat surprising in these results is the fact that neither education nor total assets were significant in the model. Much research has suggested that both education and financial assets contribute to more positive physical and psychological outcomes.

Table 11

*Regression Coefficients Obtained in Multiple Regression Analyses with Control*

*Variables Predicting Time 10 Depressive Symptomatology and Life Satisfaction – Model*

*1 Control Variables (N = 255)*

Predictor	Time 10 Depressive Symptomatology			Time 10 Life Satisfaction		
	<i>b</i> coefficient	$\beta$	t	<i>b</i> coefficient	$\beta$	t
Age	0.15	0.09	1.50	-0.01	-0.01	-0.10
Gender	1.57	0.13	2.10*	-0.58	-0.08	-1.21
Marital Status	-0.78	-0.07	-0.85	0.85	0.13	1.43
Living Status	2.21	0.19	2.20*	-1.65	-0.23	-2.55*
Health	-2.67	-0.34	-5.98*	1.50	0.31	5.20*
Appraisal						
Education	-0.17	-0.74	-1.28	-0.05	-0.04	-0.63
Assets	-0.06	-0.03	-0.59	0.12	0.11	1.85

Model Fit Statistics		
	Time 10 Depressive Symptomatology	Time 10 Life Satisfaction
<b>Model R<sup>2</sup></b>	.019	0.15
<b>Model F</b>	8.07*	6.48*

\* Indicates statistical significance at  $p < .05$

### *Completing Step 1 – The Addition of Each Covariate to the Model*

To complete Step 1, the covariates were added individually to the control model. Parameter estimates ( $b$ ), standardized multiple regression coefficients ( $\beta$ ), and the uniqueness index for each variable as it is added to the model are provided in Tables 12 and 13. Uniqueness indices were tested for statistical significance with an F test which tests the null hypothesis that the uniqueness index for the variable of interest is equal to zero. The order in which the covariates were added to the model was based upon the magnitude of influence each was expected to contribute to the explanatory ability of the model. Those variables that were expected to be most influential were added first. For example, positive and negative affect have been shown to be very closely related to the dependent variables, and in some cases have been considered as proxy measures for them. Likewise, baseline measures of life satisfaction and depressive symptomatology were expected to be moderately predictive of the dependent variables. Indeed, all four variables had been found to be moderately and significantly correlated with the dependent variables in bivariate analyses. The remaining health and function variables were expected to exert relatively less explanatory power to the model, and thus were added later in the model.

Table 12

*Building Model 1 – Regression Coefficients and Uniqueness Indices Obtained in Multiple Regression Analyses Predicting Depressive Symptomatology - Controls + Individual Covariates (N = 255)*

<b>Predictor</b>	<b><i>b</i> coefficient</b>	<b><math>\beta</math></b>	<b>t</b>	<b>Model R<sup>2</sup></b>	<b>Uniqueness Index</b>	<b>Model F</b>
Control Variables				.19		8.07*
Controls + Covariates				.33		8.60*
Negative Affect	0.52	0.36	4.98*	.26	.07*	10.84*
Positive Affect	-0.33	-0.21	-3.83*	.30	.04*	11.81*
Life Satisfaction	-0.15	-0.09	-1.41	.31	.01*	10.87*
Depressive Symptomatology	0.24	0.21	2.80*	.33	.02*	10.87*
IADLs	-1.04	-0.04	-0.81	.33	.002	10.00*
ADLs	4.43	0.09	0.02	.33	.002	9.29*
Chronic Conditions	-0.07	-0.02	-0.34	.33	.00	8.60*

\* Indicates statistical significance at  $p < .05$

Table 13

*Building Model 1- Regression Coefficients and Uniqueness Indices Obtained in Multiple Regression Analyses Predicting Life Satisfaction – Controls + Individual Covariates*

<b>Predictor</b>	<b><i>b</i></b>	<b><math>\beta</math></b>	<b><i>t</i></b>	<b>Model R<sup>2</sup></b>	<b>Uniqueness</b>	<b>Model F</b>
	<b>coefficient</b>				<b>Index</b>	
Control Variables				.15		6.48*
Controls + Covariates				.34		9.03*
Negative Affect	-0.26	-0.23	-3.77*	.20	.05*	7.75*
Positive Affect	0.22	0.22	3.92*	.25	.04*	9.00*
Life Satisfaction	0.38	0.35	5.70*	.34	.09*	12.38*
Depressive Symptomatology	-0.07	-0.10	-1.34	.34	.004*	11.46*
IADLs	-0.15	-0.01	-0.19	.34	.00	10.46*
ADLs	-3.38	-0.11	-1.11	.35	.00	9.76*
Chronic Conditions	0.03	0.01	0.22	.35	.00	9.03*

\* Indicates statistical significance at  $p < .05$



With only the control variables in Model 1 (Table 11), gender, living status and health self appraisal were significantly associated with Time 10 depressive symptomatology. With the addition of negative affect to the model, gender became insignificant, but age became significant, and remained so throughout the addition of the remaining covariates. The lack of significance of gender in this model was somewhat unexpected given the significant findings in both previous literature and the bivariate analyses for this study, which indicate that levels of depressive symptomatology tend to vary by gender. The next covariates added to the model, positive affect, followed by baseline life satisfaction, revealed significant associations with the dependent variable. Although demonstrating significance itself, once baseline depressive symptomatology was added to the model, living status was no longer significant. However, living status became significant again when IADL measures were added to the model, and remained significant with the addition of the remaining covariates (ADLs, chronic conditions). Again, somewhat surprising were the lack of significant effects indicated when the health and physical effects variables were added to the model. Despite significant correlational relationships with Time 10 depressive symptomatology, neither IADLs ( $r = -.15, p < .05$ ) nor chronic conditions ( $r = .16, p < .05$ ) reached significance at any time in the model.

As expected, once all the covariates were added to the control model, a much greater proportion of the variance was explained for each of the dependent variables. As a linear combination, the controls and covariates accounted for approximately 33% of the variance in Time 10 depressive symptomatology, whereas the combination accounted for approximately 34% of the variance in Time 10 life satisfaction. Unexpectedly, however, few of the associations between the covariates and the dependent variables reached significance. In predicting Time 10

depressive symptomatology, only positive affect ( $b = -.23$ ,  $t = -2.51$ ,  $p < .05$ ) and baseline depressive symptomatology ( $b = .25$ ,  $t = 2.87$ ,  $p < .05$ ) reached significance. Based upon bivariate results, it had been anticipated that baseline life satisfaction ( $r = -.30$ ,  $p < .01$ ) and negative affect ( $r = .41$ ,  $p < .01$ ) would show significant predictive influence as well. Similarly, only positive affect ( $b = .13$ ,  $t = 2.24$ ,  $p < .05$ ) and baseline life satisfaction ( $b = .37$ ,  $t = 5.49$ ,  $p < .01$ ) exhibited significant influence in the explanation of variance in Time 10 life satisfaction. Based upon bivariate results, it was expected that baseline depressive symptomatology ( $r = .37$ ,  $p < .01$ ) and negative affect ( $r = -.27$ ,  $p < .01$ ) would be significant predictors of Time 10 life satisfaction. Table 14 shows the results of Step 1 when the model was run with controls and covariates added simultaneously to predict Time 10 depressive symptomatology and Table 15 contains the results for the prediction of Time 10 life satisfaction when the controls and covariates were entered simultaneously.

When Time 10 life satisfaction was regressed on the control variables entered as a block, approximately 15% of the variance was explained. In this initial model, living status ( $b = -1.65$ ,  $t = -2.55$ ,  $p < .05$ ) and health self appraisal ( $b = 1.50$ ,  $t = 5.20$ ,  $p < .01$ ) were significant. Although they remained significant throughout the addition of the covariates, their influence was reduced further as each covariate was added to the model. Negative affect ( $b = -.26$ ,  $t = -3.77$ ,  $p < .05$ ), positive affect ( $b = .22$ ,  $t = 3.93$ ,  $p < .05$ ), and baseline life satisfaction ( $b = .38$ ,  $t = 5.70$ ,  $p < .01$ ) all demonstrated significance as they were added to the model. However, negative affect was no longer significant once baseline depressive symptomatology was added to the model. As suggested in some previous studies, this could be a reflection of overlapping influence of negative affect and depressive symptomatology. Not surprisingly, as the physical health and functioning variables were added to the model, the influence of baseline depressive symptomatology,

though still not significant, and life satisfaction increased. Thus, in predicting Time 10 life satisfaction among this sample, respondent physical health and functioning seem to contribute to the predictive power of both baseline depressive symptomatology and baseline life satisfaction.

The final task of Step 1 was to regress each of the dependent variables on the controls and covariates that had been added into the model simultaneously. These results are summarized in Table 16. Results indicate that the linear combination of all the controls and covariates accounts for approximately 33% of the variance in Time 10 depressive symptomatology and 34% of the variance in Time 10 life satisfaction. Once the controls and covariates were entered together as a block, results were more consistent with expectations. For example, in predicting Time 10 depressive symptomatology, living status ( $b = 1.92, t = 2.02, p < .05$ ) and health self-appraisal ( $b = -1.86, t = -2.24, p < .05$ ) were significant, indicating that living alone is predictive of higher levels of depressive symptomatology, and that those with a more negative health self-appraisal are more likely to demonstrate higher levels of depressive symptomatology. Also significant in this model was respondent age ( $b = 0.21, t = 2.31, p < .05$ ), indicating that, as age increases, depressive symptomatology is more likely to increase as well. These relationships are all consistent with previous research with elderly populations. Also, as might be expected, other predictors demonstrating significant influence on depressive symptomatology at Time 10, were baseline measures of positive affect ( $b = -0.23, t = -2.51, p < .05$ ) and depressive symptomatology ( $b = .25, t = 2.87, p < .05$ ), both of which had demonstrated significant correlation with Time 10 depressive symptomatology in bivariate analyses. These results suggest that higher levels of positive affect are

associated with lower levels of depressive symptomatology, and that respondents reporting higher levels of depressive symptomatology at baseline, are more likely to report higher levels of depressive symptomatology at Time 10. Baseline measures of negative affect and life satisfaction, however, both of which had demonstrated significant bivariate correlations with Time 10 depressive symptomatology, were not significant in these analyses.

Table 14

*Model 1 - Regression Coefficients Obtained in Multiple Regression Analyses Predicting Depressive Symptomatology with Controls and Covariates (N = 255)*

Predictor	Time 10 Depressive Symptomatology			Time 10 Life Satisfaction		
	<i>b</i> coefficient	$\beta$	<i>t</i>	<i>b</i> coefficient	$\beta$	<i>t</i>
Age	0.21	0.12	2.31*	-0.04	-0.04	-0.75
Gender	1.21	0.10	1.66	-0.53	-0.07	-1.15
Marital Status	-0.99	-0.09	-1.15	0.74	0.11	1.38
Living Status	1.92	0.17	2.02*	-1.25	-0.17	-2.09*
Health Appraisal	-0.12	-0.05	-1.00	0.93	0.19	3.06*
Education	-1.86	-0.24	-3.86*	-0.0	-0.05	-1.01
Assets	-0.04	-0.02	-0.45	0.06	0.06	1.06
Negative Affect	0.24	0.13	1.83	-0.01	-0.01	-0.18
Positive Affect	-0.23	-0.15	-2.51*	0.13	0.13	2.24*
Life Satisfaction	-0.11	-0.07	-1.07	0.37	0.34	5.49*
Depressive Symptomatology	0.25	0.25	2.87*	-0.08	-0.10	-1.42
IADLs	-2.78	-0.12	-1.17	1.20	0.08	0.80
ADLs	4.48	0.09	0.92	-3.41	-0.11	-1.11
Chronic Conditions	-0.07	-0.02	-0.34	0.03	0.01	0.22

Model Fit Statistics		
Model R <sup>2</sup>	.33	.34
Model F	8.60*	9.03*

\* Indicates statistical significance at p<.05

### *Step2 – Adding Religiosity to the Model*

For Step 2, the dependent variables were regressed on a linear combination of the controls and covariates, which were added as a block, and the independent variable (religiosity), which was added last to the model. Contrary to expectations, the addition of religiosity to the model did not increase the proportion of variance explained in Time 10 depressive symptomatology. As seen in Table 17, the addition of religiosity to the second model had very little impact on the parameter estimates or beta weights for any of the variables that had been entered into the first model. Further, the uniqueness index for religiosity was insignificant ( $U = .00002380$ ). Although religiosity's association with Time 10 depressive symptomatology was in the expected direction (negative), religiosity actually accounted for the least amount of influence of any of the predictors in the model. Thus, although Model 2 explained a significant proportion of the variance in Time 10 depressive symptomatology, the addition of religiosity to the model did not result in a better explanatory model than the first model. Therefore, hypothesis 1.2, that religious involvement is inversely associated with Time 10 depressive symptomatology, after controlling for sociodemographic factors and covariates, was not statistically supported. Further, in light of the fact that religiosity was not a significant predictor of Time 10 depressive symptomatology (dependent variable), conditions necessary to test for mediation were not met. Therefore, Hypothesis 2.2, which posited that optimism would mediate a significant relationship between religiosity and Time 10 depressive symptomatology once sociodemographic variables and covariates were controlled, was not supported. The results of Model 2 in regard to Time 10 depressive symptomatology

suggest that: a) as age increases, depressive symptomatology is more likely to increase; b) living alone at baseline is more likely to be associated with higher levels of depressive symptomatology at outcome; c) health self-appraisal is negatively related to depressive symptomatology, in that those who view themselves as average to moderately healthy report lower levels of depressive symptomatology; d) individuals reporting higher levels of depressive symptomatology at Time 1 were more likely to report higher levels of depressive symptomatology at Time 10. Surprisingly, gender did not appear to be significantly associated with Time 10 depressive symptomatology, nor did marital status, assets or life satisfaction, despite significant bivariate correlations and assertions by many researchers of their significant influence on depression. Also, neither levels of functional disability nor number of chronic conditions proved significant despite expectations that, in older populations, functional decline normally associated with age might lead to greater levels of depressive symptomatology. However, as previously stated, this sample was drawn from an elderly population which seems to enjoy better than average health, education, and financial security.

When religiosity was added to the model predicting Time 10 life satisfaction, however, there was a significant association (Table 15). When religiosity was added to the control variables and covariates in Model 2, there was a significant increase in the proportion of variance explained and in the Model F value ( $R^2 = .37$ ,  $F[15, 239]$ ,  $p < .001$ ). Health self-appraisal and baseline life satisfaction demonstrated significance, as they had in the first model, but positive affect and living status were no longer significant. Thus, in the prediction of Time 10 life satisfaction, Model 2 demonstrates that a) positive health self-appraisal predicts higher levels of life satisfaction; b) those

respondents with higher levels of life satisfaction at Time 1 were more likely to report higher levels of life satisfaction at Time 10; c) religiosity was positively associated with Time 10 life satisfaction, in that those respondents who reported higher levels of religiosity at baseline, were significantly more likely to report higher levels of life satisfaction at Time 10. Therefore, Model 2 demonstrated support of hypothesis 1.1, that religious involvement is positively associated with Time 10 life satisfaction after controlling for sociodemographic factors and covariates.



Table 15

*Model 2 - Predicting Time 10 Depressive Symptomatology and Life Satisfaction –  
Regression Coefficients Obtained in Multiple Regression Analyses with Controls,  
Covariates, and Religiosity (N = 255)*

Predictor	Time 10 Depressive Symptomatology			Time 10 Life Satisfaction		
	<i>b</i> coefficient	$\beta$	t	<i>b</i> coefficient	$\beta$	t
<b>Control Variables</b>						
Age	0.21	0.13	2.31*	-0.05	-0.05	-0.71
Gender	1.22	0.10	1.65	-0.76	-0.10	-1.67
Marital Status	-0.98	-0.09	-1.13	0.54	0.08	-1.88
Living Status	1.92	0.17	2.00*	-1.11	-0.15	1.01
Education	-0.12	-0.05	-0.99	-0.08	-0.05	-1.04
Health Appraisal	11.86	-0.24	-3.86*	0.95	0.19	3.20*
Assets	-0.04	-0.02	-0.45	0.07	0.06	1.14
<b>Covariates</b>						
Negative Affect	0.24	0.13	1.82	-0.03	-0.03	-0.43
Positive Affect	-0.23	-0.14	-2.44*	0.09	0.09	1.58
Life Satisfaction	-0.11	-0.07	-1.05	0.35	0.33	5.26*
Depressive Symptomatology	0.25	0.21	2.84*	-0.06	-0.08	-1.11
IADLs	-2.76	-0.12	-1.16	0.95	0.06	-0.06
ADLs	4.47	0.09	0.92	-3.17	-0.10	-0.65
Chronic Conditions	-0.07	-0.02	-0.09	0.04	0.02	-1.06
<b>Independent Variable</b>						
Religiosity	-0.04	-.01	0.09	0.81	0.18	3.15*

*Continued on next page*

Table 15 Continued

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<b>Model Fit Statistics</b>		
<b>Satisfaction</b>	<b>Time 10 Depressive Symptomatology</b>	<b>Time 10 Life</b>
<b>Model R<sup>2</sup></b>	.33	.37
<b>Model F</b>	8.00*	9.41*

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\* Indicates statistical significance at p<.05

### *Step 3 – Testing for Mediation Relationships*

Data analyses in Steps 1 and 2 addressed the first summary hypothesis that religiosity is associated with subjective well-being when the linear combination of control variables and covariates are held constant. The analyses demonstrated that, for this sample, religiosity was significantly associated with Time 10 life satisfaction, but was not significantly associated with Time 10 depressive symptomatology. These analyses address the first of four conditions that, according to Baron and Kenny (1986), must be met in order to test for a mediation effect. To meet the first condition, a significant relationship must exist between the independent variable (religiosity) and the dependent variables (Time 10 life satisfaction; Time 10 depressive symptomatology). Table 16 presents a summary of bivariate correlations among the independent variable (religiosity), the proposed mediator (optimism) and both dependent variables (Time 10 depressive symptomatology, Time 10 life satisfaction). These results indicate a weak and nonsignificant negative correlation between religiosity and Time 10 depressive symptomatology, and a relatively larger, significant correlation with Time 10 life satisfaction..

Table 16

*Correlational Relationships Among Independent, Dependent and Proposed Mediating Variables (N = 255)*

Variable	Time 1 Religiosity	Time 10 Depressive Symptomatology	Time 10 Life Satisfaction	Time 5 Optimism
Religiosity	1.00	-.07	.23*	.17*
Depressive Symptomatology	-.07	1.00	-.52*	-.36*
Life Satisfaction	.23*	-.52*	1.00	.41*
Optimism	.17*	-.36*	.41*	1.00

\* Indicates statistical significance at  $p < .05$

Steps 3 and 4 examined the second and third conditions of mediation as suggested by Baron and Kenny (1986). Step 3 determined there was a significant relationship between the independent variable (religiosity) and the proposed mediating variable (optimism) by regressing optimism on religiosity, but once the controls and covariates were added to the model, the relationship was no longer significant. Step 4 determined there was a significant relationship between the mediator (optimism) and the dependent variable (Time 10 life satisfaction) by regressing life satisfaction on optimism. Step 5 tested the full model predicting Time 10 life satisfaction, adding optimism (mediator) to Model 3, in which Time 10 life satisfaction (dependent variable) was regressed on a linear combination of the control variables, covariates and religiosity (independent variable). Table 10 summarizes the results of regression analyses representing the conditions outlined in Baron and Kenny's (1986) causal steps method of mediation analyses. The summary of regression analyses results indicates that two of the conditions for mediation were not met:

- (1) The independent variable (religiosity) was not significantly associated with Time 10 depressive symptomatology (dependent variable);
- (2) The independent variable (religiosity) was not significantly associated with the proposed mediator in the multivariate model.

Thus, hypotheses 2.1 and 2.2, that optimism would mediate the association between religiosity and Time 10 depressive symptomatology and Time 10 life satisfaction were not supported. However, the results of the final model presented in Table 17, indicate that the addition of optimism (mediator) to the linear combination of variables predicting Time 10 life satisfaction did result in a slight decrease in the influence of religiosity.

Therefore, a Sobel Test was calculated to test whether the indirect effect of the independent variable (religiosity) on Time 10 life satisfaction (dependent variable) via the mediator (optimism) was significantly different from zero. The calculation produced a Sobel test statistic of 1.49 (p value = 0.14), indicating no support for significant mediation effects.

Table 17

*Model 3 - Testing for Mediation Relationships (N = 255)*

<u>Condition Tested</u>	IV→MV	<u>Betas (t Value)</u>		
		MV→DV	IV→DV	IV→DV   MV <sup>d</sup>
With Controls and Covariates				
1. Religiosity (IV) <sup>a</sup> → Optimism (MV) <sup>b</sup>	0.18 (2.97*)			
	0.10 (1.58)			
2. A. Optimism (MV) → Depressive Symptomatology (DV) <sup>c</sup>		-0.35 (-5.91*)		
		-0.13 (-2.12*)		
B. Optimism (MV) → Life Satisfaction (DV)		0.45 (8.12*)		
		0.27 (4.60*)		
3. A. Religiosity (IV) → Depressive Symptomatology (DV)			-0.06 (-.96)	
			-.005 (-.09)	
B. Religiosity (IV) → Life Satisfaction (DV)			0.24 (3.89*)	
			0.18 (3.15*)	
4. A. Religiosity (IV) → Depressive Symptomatology (DV)   (MV) <sup>d</sup>				0.01 (.12)
B. Religiosity (IV) → Life Satisfaction (DV)   (MV) <sup>d</sup>				0.15 (2.81*)

<sup>a</sup> IV = Independent Variable.<sup>b</sup> MV = Mediator Variable.<sup>c</sup> DV = Dependent Variable.<sup>d</sup> Controlling for sociodemographic variables and covariates.

\* Indicates statistical significance at p&lt;.05.

### *Summary of Findings*

The first hypothesis for this study posited that baseline measures of religiosity would be positively associated with Time 10 life satisfaction (hypothesis 1.1) and inversely associated with Time 10 depressive symptomatology (hypothesis 1.2) in elderly adults. The analyses demonstrated a significant positive relationship between religiosity ( $\beta = 0.15$ ,  $t = 2.81$ ,  $p < .05$ ) and Time 10 life satisfaction, but the relationship with Time 10 depressive symptomatology ( $\beta = 0.01$ ,  $t = .10$ ), although in the expected direction, was not significant. The beta weights for all controls and covariates were in the expected direction, though surprisingly, many did not demonstrate significance. Of the control variables and covariates included in the models, only health self-appraisal ( $\beta = 0.14$ ,  $t = 2.32$ ,  $P < .05$ ) and baseline life satisfaction ( $\beta = 0.30$ ,  $t = 5.03$ ,  $p < .05$ ) demonstrated significant influence in predicting life satisfaction, with levels of life satisfaction reported at baseline demonstrating the strongest predictive power. Respondent age ( $\beta = 0.12$ ,  $t = 2.24$ ,  $p < .05$ ), health self-appraisal ( $\beta = -0.21$ ,  $t = -3.34$ ,  $p < .05$ ), positive affect ( $\beta = -0.14$ ,  $t = -2.33$ ,  $p < .05$ ) and baseline depressive symptomatology ( $\beta = 0.18$ ,  $t = 2.37$ ,  $p < .05$ ) were significant predictors of Time 10 depressive symptomatology. Thus, the strongest predictor of Time 10 depressive symptomatology in these elderly respondents was the level of depressive symptomatology they reported at baseline.

The second set of hypotheses which were related to the mediation effects of optimism, were not supported. Consistent with recommendations of Baron and Kenny (1986), causal steps mediational analysis was not completed since the independent variable (religiosity) was not significantly associated with Time 10 depressive symptomatology or the hypothesized mediator (optimism). Thus, hypotheses 2.1 and 2.2



were not supported. Although the addition of optimism to the final model suggested possible indirect effects in that the influence of religiosity on Time 10 life satisfaction was reduced slightly, a Sobel Test indicated that the indirect effects of optimism were not significant.

A summary of the contribution to the final regression model made by each predictor is presented in Table 21. Table 22 presents a summary of the beta weights and t values for the significant predictors of each of the dependent variables in order of the strength of their influence. Figure 10 presents a summary of the findings demonstrated by the data analyses in relation to each of the hypotheses proposed by this study.

Table 18

*Summary of Regression Analysis for Variables Predicting Time 10 Depressive**Symptomatology and Time 10 Life Satisfaction (N = 255)*

<b>Predictor</b>	<b>Depressive Symptomatology</b> <b>R<sup>2</sup> = .35 F = 7.89*</b>		<b>Life Satisfaction</b> <b>R<sup>2</sup> = .42 F = 10.67*</b>	
	<b>β</b>	<b>t</b>	<b>β</b>	<b>t</b>
Age	0.12	2.24*	-0.04	-0.74
Gender	0.11	1.74	-0.11	-1.90
Marital Status	-0.07	-0.85	0.03	0.45
Living Status	0.15	1.78	-0.11	-1.48
Education	-0.06	-1.15	-0.04	-0.77
Health Self Appraisal	-0.21	-3.34*	0.14	2.32*
Assets	-0.02	-0.31	0.05	0.89
Negative Affect	0.12	1.71	-0.01	-0.19
Positive Affect	-0.14	-2.33*	0.08	1.39
Life Satisfaction	-0.05	-0.86	0.30	5.03*
Depressive Symptomatology	0.18	2.37*	-0.02	-0.26
IADLs	-0.10	-0.98	0.03	0.29
ADLs	0.08	0.81	-0.08	-0.87
Chronic Conditions	-0.02	-0.29	0.01	0.17
Religiosity	0.01	0.12	0.15	2.81*
Optimism	-0.13	-2.11*	0.25	4.36*

\* Indicates statistical significance at  $p < .05$

Table 19

*Summary Table of Beta Weights of the Most Influential Predictors of Time 10 Life*

*Satisfaction and Time 10 Depressive Symptomatology (N = 255)*

<b>Most Influential Predictors of Time 10 Life Satisfaction</b>	<b><math>\beta</math></b>	<b>t</b>
Baseline Life Satisfaction	0.30	5.03*
Optimism	0.25	4.36*
Religiosity	0.15	2.81*
Health Self-Appraisal	0.14	2.32*

<b>Most Influential Predictors of Time 10 Depressive Symptomatology</b>	<b><math>\beta</math></b>	<b>t</b>
Health Self-Appraisal	-0.21	-3.34*
Baseline Depressive Symptomatology	0.18	2.37*
Positive Affect	-0.14	-2.33*
Optimism	-0.13	-2.11
Age	0.12	2.24*

\* Indicates statistical significance at  $p < .05$

<b>Study Hypotheses</b>	<b>Findings</b>
1. Religious involvement is positively associated with subjective well-being in elderly adults, after controlling for sociodemographic factors, baseline health and function, depressive symptomatology, life satisfaction, and positive and negative affect.	This summary hypothesis was not completely supported. The findings were mixed. Religiosity, as measured at Time 1, was significantly associated with life satisfaction at Time 10, but was not significantly associated with depressive symptomatology at Time 10.
1.1. Religious involvement is positively associated with life satisfaction in elderly adults after controlling for sociodemographic factors, baseline health and function, depressive symptomatology, life satisfaction, and positive and negative affect.	This hypothesis was supported. Time 1 religiosity was positively associated with Time 10 life satisfaction in a sample of elderly adults. Beta weights indicate that religiosity ( $\beta = .18, t = 3.15, p < .05$ ) ranked third in strength of influence among the three variables that demonstrated significance in the regression model to predict life satisfaction. Baseline life satisfaction ( $\beta = .33, t = 5.26, p < .05$ ) and health self-image ( $\beta = .19, t = 3.20, t = < .05$ ) each demonstrated larger beta weights.
1.2. Religious involvement is inversely associated with depressive symptomatology in elderly adults after controlling for sociodemographic factors, baseline health and function, depressive symptomatology, life satisfaction, and positive and negative affect.	This hypothesis was not supported. Although its beta weight was in the expected direction, religiosity's influence was weak and insignificant ( $\beta = -.01$ ) in the prediction of depressive symptomatology in elderly adults.
2. The association between religious involvement and subjective well-being in elderly adults is mediated by optimism, after controlling for sociodemographic factors, baseline health and function, depressive symptomatology, life satisfaction, and positive and negative affect.	This summary hypothesis was not supported. Conditions for mediation were not met.

*Figure 10.* Summary of Findings By Study Hypothesis

Figure 10 (Continued).

<b>Study Hypotheses</b>	<b>Findings</b>
<p>2.1. The association between religious involvement and life satisfaction in elderly adults is mediated by optimism, after controlling for sociodemographic factors, baseline health and function, depressive symptomatology, life satisfaction, and positive and negative affect.</p>	<p>This hypothesis was not supported. When optimism (mediator) was added to the model, the effect of religiosity (independent variable) was slightly reduced, but remained significant in the explanation of variance in the dependent variable (Time 1 life satisfaction). However, a Sobel Test indicated that the indirect effect of religiosity (independent variable) Time 10 life satisfaction via optimism (mediator) was not significantly different from zero.</p>
<p>2.2. The association between religious involvement and depressive symptomatology in elderly adults is mediated by optimism, after controlling for sociodemographic factors, baseline health and function, depressive symptomatology, life satisfaction, and positive and negative affect.</p>	<p>This hypothesis was not supported. Religiosity did not demonstrate a significant relationship with Time 10 depressive symptomatology, thus the criteria for mediation was not met and mediational analyses were not completed.</p>

## Chapter Five

### *Discussion*

It has been well established in the literature that adults over the age of 65 are among the fastest growing segments of the population in the United States. Consistent with this trend, researchers in the field of gerontology appear to be broadening their focus to look beyond the goal of increasing the lifespan and are searching in earnest for ways to enhance the quality of later years. Researchers have thus far failed to agree upon what, exactly, constitutes successful negotiation of the later years of the lifespan. Labels such as resilient, robust, productive, and hardy have been used to describe individuals who are able to successfully adapt to or rise above the challenges often created by the aging process. To date, there is no universally accepted definition or model of successful aging nor is there consensus regarding how the concept should be operationalized. However, despite the fact that no common nomenclature or all inclusive theory have been established, a common theme throughout the field of gerontology is the need to identify personality, physical, social, and contextual factors and traits that distinguish those older adults who age more successfully than those who do not.

There has been a growing interest over the past decade in research aimed at linking religion or religious involvement with a broad range of physical and mental health outcomes. There have been hundreds of empirical studies that have investigated the effects of some aspect of religion on health, health behaviors, morbidity, mortality, and numerous psychological outcomes (e. g., Ellison, 1994; Koenig, 1990; Levin &

Schiller, 1987; Witter, Stock, Okun, & Haring, 1985). Despite limitations imposed by methodological differences and lack of a common measurement strategy, the findings have consistently, though not universally, found evidence for the beneficial effects of religion (Levin, 1994a). Levin (1994a) has suggested that religion serves as a profoundly important personal resource for older adults in particular, and that as individuals age, religiosity becomes strongly predictive of better health and well-being. Not only does the predictive power remain even after controlling for the effects of health status, but the magnitude of the effect has been shown to be at least as great as that of health itself on well-being (Levin, 1994a). Levin has argued that this is particularly noteworthy in light of the fact that it has been generally accepted that one's health is the best predictor of one's well-being. Further, the influence of religion on well-being is not eliminated by controlling for sociodemographic factors.

The purpose of this study was to determine if, while holding a number of possible confounders and covariates constant, religiosity predicts subjective well-being in elderly adults and, if it does, to explore the extent to which that relationship is mediated by dispositional optimism. The exploration of these possible resiliency resources is important for increasing the understanding of how they might serve to enhance successful adaptation to the changes inherent in aging and for gaining a better understanding of individual differences in late life outcomes. Although these resources cannot stop the aging process, nor can they prevent loss or decline, they may be important tools for helping elderly adults to maintain their level of functioning, to recover more quickly or even, perhaps, advance beyond their previous level of functioning when confronted with challenges or adversity. The ability to protect against negative declines and losses

associated with aging and the promotion of resiliency and optimal adjustment in advancing years have the potential to increase the numbers of elders who are able to remain independent in the community as they successfully negotiate the aging process.

### *Summary of Findings*

Hierarchical regression analyses were used to test hypotheses postulating that, with confounders and covariates controlled, religiosity is significantly associated with depressive symptomatology and life satisfaction in a sample of elderly, retirement-community-dwelling adults, and that those relationships are mediated by optimism. The hypotheses were not entirely supported by the analyses. Results revealed that there was no evidence supporting the hypothesis that there is a significant association between religiosity and future depressive symptomatology once sociodemographic variables and covariates are controlled. With no association demonstrated between the two variables, a test for mediation could not be completed. Although the findings did reveal support for the hypothesis that religiosity is significantly associated with future life satisfaction, once sociodemographic variables and covariates were controlled, no evidence of a significant mediation effect of optimism was found.

### *Predicting Depressive Symptomatology in Older Adults*

The data analyses provided several unexpected findings. As expected, bivariate analyses demonstrated that religiosity (independent variable) was significantly, though weakly, negatively correlated with baseline depressive symptomatology ( $r = -.10$ ,  $p < .05$ ). Unexpectedly, however, it was not significantly correlated with depressive symptomatology at Time 10 (dependent variable), nor did it demonstrate a significant



association in regression analyses predicting Time 10 depressive symptomatology. In this sample of older adults, there was no evidence that individuals with higher levels of religiosity scored significantly lower on depressive symptomatology than individuals with lower levels of religiosity. This finding is somewhat inconsistent with numerous studies which have found various measures of religious involvement to be significantly associated with mental health outcomes such as depression and anxiety and other indicators of subjective well-being (e. g., Ellison, 1994, 1995, 1998; Fehring, Miller, & Shaw, 1997; Helm, Hays, Flint, Koenig, & Blazer, 2000; Idler, 1987; Idler & Kasl, 1997; Jensen, Jensen, & Wiederhold, 1993; Kennedy, Kelman, Thomas, & Chen, 1996), Koenig, Hays, George, Blazer, Larson & Landerman, 1997; Levin, 1994; McCullough & Larson, 1999; Meisenhelder & Chandler, 2002). However, Koenig (2001) reported in a review of studies investigating the association between religiousness/spirituality and mental health that the findings have been mixed. Likewise, Hackney and Sanders (2003) produced meta-analysis results indicating that the relationship between religiousness and mental health outcomes varied as a function of the operationalization of the constructs being studied. The findings from this study appear to be more consistent with those of Wink, Dillon and Larsen (2005), who found religiousness to be unrelated to depression in their sample of relatively healthy older adults.

As stated previously, the conditions for mediation were not met in the analyses to predict Time 10 depressive symptomatology therefore optimism (mediator) could not be tested as a mediator. However, when optimism was added to the model as an additional independent variable, it did demonstrate significant influence in the prediction of depressive symptomatology ( $\beta = -0.13$ ,  $t = -2.11$ ,  $p < .05$ ), and its addition increased the

proportion of variance accounted for in the dependent variable. In the final model, results indicated that lower levels of optimism were significantly associated with higher levels of depressive symptomatology. These findings are consistent with a growing literature that has linked optimistic orientation with more optimal outcomes (e. g., Aspinwall & Taylor, 1992; Birren & Renner, 1980; Brenes, et al., 2002; Fredrickson, 2001; Peterson, 2000; Scheier, et al., 1994). Previous researchers have also used the Life Orientation Test (LOT), to demonstrate that dispositional optimism remained a significant predictor of future optimism even after other possible overlapping variables such as neuroticism, trait anxiety, and mastery were controlled (e. g., Scheier & Carver, 1987; 1994; Vickers & Vogeltanz, 2000). Vickers and Vogeltanz (2000) found that measures of dispositional optimism could be used to predict future depression over and above initial levels of depression, positive and negative affect, attributional style and daily hassles. Their work is perhaps most similar to this study in that they used a revised version of the LOT as was used in this study. They concluded that variables that predicted depression over the effects of Time 1 depressive symptoms, such as dispositional optimism, could be considered more unique predictors of future depression.

Since it is generally accepted that dispositional optimism is stable over time, it is possible that its association with depressive symptomatology represents a protective mechanism that serves to decrease an individual's vulnerability to depressive symptomatology throughout the life course. Optimistic orientation may promote more adaptive coping capabilities that serve to better prepare individuals for the challenges and changes they will undoubtedly encounter in older age. Descriptive analyses indicated that mean levels of depressive symptomatology for the final study sample did change

over the ten years between baseline measurement (mean = 6.46, SD = 4.85) and Time 10 measurement (mean = 9.82, SD = 5.73). Thus, there was change over time in mean levels of depressive symptomatology for the sample, as would be expected with increasing age. With the current study it is not possible to determine if optimism might be exerting mediating influence on the rate of change in depressive symptomatology levels in the individuals in the study. It could be argued that this particular sample might exhibit widespread optimistic orientation and reduced vulnerability to maladaptive changes associated with aging in general. Thus, they may be less vulnerable to depressive symptomatology. They appear to be at least somewhat financially secure, have chosen to relocate to a specially designed retirement community where they are surrounded by peers of similar backgrounds, have considerable access to social support, recreational outlets, transportation, health care, and volunteer opportunities. Almost 70% of the sample reported that they perceived their health to be good or very good, and they reported minimal disability. They have chosen to live in a community that encourages an active, engaged lifestyle. Thus, in light of the resources available to them, they may be less vulnerable to depression in general, or less likely to develop depressive symptoms over time, regardless of optimistic orientation.

But why was Time 10 depressive symptomatology not predicted by religiosity in this sample of older adults? Part of the answer may be found in examining why higher levels of religiosity were expected to be associated with lower levels of depressive symptomatology. It has been suggested that religious involvement may impede depression in a number of ways, including, but certainly not limited to, providing social interaction, increasing perceived support and a sense of belonging or embeddedness in

the community, enhancing self-esteem and sense of personal mastery and sense of control over one's personal affairs, fostering feelings of worth and meaningfulness in life, promoting self-care and positive decision making (Beck, 1967; Cohen & Willis, 1985; Durkheim, 1901/1933; Ellison, 1991; 1994; Pearlin & Schooler, 1978; Wethington & Kessler, 1986). Perhaps, in this sample, many of the resources expected to be garnered from religiosity are also readily available in the respondents' environment. The respondents in this study reside in an expansive but tightly-knit condominium complex that affords them easy access to transportation, medical care, recreational resources, and daily social interaction with peers of their age group. Residents are encouraged to participate in community planning, decision making, and activities. Each building has a welcoming committee and a designated resident to check on shut-ins and represent the residents on community decisions. The residents have control over their own personal dwelling, while the complex staff attends to the façade as well as security, lighting, roadways, etc. Over 50% of the respondents reported that they did not live alone. And the majority reported membership in a local religious institution. Thus, for many of these older adults, religious involvement may actually provide redundant resources.

An alternative explanation for the lack of significant association between religiosity and depressive symptomatology might be that the relationship is actually masked by the high level of religiosity in this sample, which made it difficult to find any religiosity effects. Or perhaps, it is a result of limited variability in the sample on the measures of depressive symptomatology. As discussed previously, this sample is not a precise representation of the general population, nor is it a clinical sample, and the level of depressive symptomatology was generally low, and there was not a great deal of

change in the mean level over the 10 year study period. This narrowed variability may have attenuated the relationships.

In the current study, neither chronic health conditions nor physical function and disability variables demonstrated significant predictive power of either Time 10 depressive symptomatology or Time 10 life satisfaction. This, too, was surprising in light of research which has suggested associations between poor mental health outcomes and well-being, and declines in health and function and chronic illnesses (e. g., Bisschop, et al., 2004; George & Fillenbaum, 1985; Larsen, 1978) often thought to be an unpreventable part of increasing age. Perhaps the lack of significant association between physical health and function and well-being outcomes found here is a product of the better-than-average health, education, and financial security characteristics of the sample. At baseline, sample respondents reported very low levels of IADL and ADL difficulty, with slightly over 83% reporting no IADL difficulties and almost 97% reporting no ADL difficulties. More than half of the sample reported 2 or fewer chronic conditions. Although purposely controlled to reduce the possibility of spurious associations due to their influence, it was nevertheless anticipated that the health and function variables would provide significant explanatory power in the regression models. However, it is possible that their lack of significance in the model is a demonstration of the principle of diminishing returns – that because there were a moderate number of correlated predictor variables that accounted for meaningful amounts of unique variance, variables added late in the model-building process accounted for smaller and smaller proportions of unique variance (Hatcher & Stepanski, 1994).

An extremely large proportion of the sample (88%) reported 12 years or more of education, with almost 61% indicating that they had more than 12 years of education. All respondents indicated that they owned at least one home, and over half of them indicated that their total assets were above \$175,000. There is copious literature from a number of research fields that demonstrates that education and income, often combined to represent socioeconomic status, are strong predictors of more optimal outcomes. Thus, since this sample reports high levels of education and relatively high levels of financial security, high levels of physical and psychological functioning would not be extraordinary (e. g., Berkman, et al., 1993; Guralnik, et al., 1993; Snowdon, Ostwald, & Kane, 1989). Consistent with those characteristics, an inverse relationship with depressive symptomatology was expected.

Interestingly, education was not correlated with Time 10 depressive symptomatology, nor was it significant in the regression model. Likewise, total assets, though significantly correlated with Time 10 depressive symptomatology ( $r = -.12$ ) was not a significant predictor in the regression model predicting Time 10 depressive symptomatology. Since it has been repeatedly demonstrated that elderly adults with higher socioeconomic status tend to exhibit more enhanced well-being and are more likely to be considered to be aging successfully (Aneshensel, 1992; 2002; Baltes & Lang, 1997; Thoits & Hewitt, 2001; Wilson, 2000), it was expected that education and financial assets would demonstrate significance throughout the analysis process. The lack of significant predictive power of these variables may be due to the lack of variance in the values, in that the data was somewhat skewed toward higher values.

With the exception of age, the remaining sociodemographic variables also failed to demonstrate significant influence on Time 10 depressive symptomatology in the final regression model. Although there are findings in the previous literature suggesting that depressive outcomes are associated with marital and living status (e. g., Berkman, et al., 1993; Bisschop, et al., 2004; Bosworth & Schaie, 1997; Kahana, et al., 2002; Ross & Mirowsky, 1989; Strawbridge et al., 1996), the lack of significant findings for these indicators in this study may be attributed to the fact that they were measured at baseline, whereas the depressive symptomatology measure that served as the criterion variable was measured 10 years later. It is quite possible that the respondent's marital or living status could have changed during the years leading up to the Time 10 measurement. It is therefore more likely that the criterion measurement reflects the influence of the respondents' living status at Time 10 rather than at baseline.

The importance of controlling negative affect when investigating the predictive ability of other variables in the study of depression has been suggested in the literature (Elliot, Marmarosh, & Pickelman, 1994). In this study, somewhat inconsistent with previous literature, negative affect, though highly correlated with Time 10 depressive symptomatology ( $r = .41, p < .05$ ), was not significant in the final regression model. Based on research that has demonstrated that higher levels of negative affect are predictive of greater incidence of negative emotions, including depression (Chang & Sanna, 2001; Chang, et al., 1997; Fratiglioni, et al., 2000; Kivela & Pahkala, 2001; Hillerås, et al., 1998; Willis, 1986), it was expected that NA would have significant influence in models predicting depressive symptomatology. The fact that this did not prove to be the case is quite possibly a result of redundancy - negative affect actually

overlapped with the measure of Time 1 depressive symptomatology. In cases where two measures are repetitive or redundant, the  $\beta$  for both variables in the regression model are reduced since they are splitting their influence on the criterion variable (Pedhazur, 1997).

### *Predictors of Depressive Symptomatology*

The indicators that demonstrated significant predictive power in the prediction of Time 10 depressive symptomatology were age, health self-appraisal, positive affect and baseline depressive symptomatology. The most powerful predictor of Time 10 depressive symptomatology in this sample of older adults was the level of health self-appraisal reported at baseline ( $\beta = -0.21$ ,  $t = -3.34$ ,  $p < .05$ ). There was an inverse relationship between the two measures, where the higher the respondent's rating of health status at baseline, the lower the level of depressive symptomatology at Time 10. This is consistent with much previous research that has indicated that self-reported health status, even when posed as a single question, is a powerful predictor of a wide range of outcomes. The findings here make sense intuitively, since it is more likely that an individual will report less psychological distress if they are experiencing higher levels of perceived health. It is also possible that individuals who report higher levels of self-rated health are more likely to be positive in other aspects of their life as well and, thus, report fewer symptoms of psychological distress. Further, one cannot rule out the possibility that measures of self-rated health are influenced by social comparison bias or social desirability, whereby respondents' perception of their health status is influenced by a comparison to the health status of those around them (social comparison) or a desire to create a certain image of



themselves as either more healthy or less healthy (desirability bias) with their choice of response.

Although not the most powerful predictor, baseline depressive symptomatology was found to be significant in the prediction of Time 10 depressive symptomatology. This is somewhat, though not totally, consistent with previous research which has found baseline depressive symptoms to be the most powerful predictor of future depressive symptoms (Lewinsohn, Roberts, Seeley, Rohde, Gotlib, & Hops, 1994; Skevington, 1993; Vickers & Vogeltanz, 2000).

Since the relationship between low positive affect and depressive symptoms has been well established in the literature (Jolly, Dyck, Kramer, & Wherry, 1994; Watson, Clark, & Carey, 1988; Vickers & Vogeltanz, 2000), it was expected that baseline positive affect measures would be associated with Time 10 depressive symptomatology. This was indeed the case, with positive affect demonstrating a negative relationship with the criterion variable such that lower levels of positive affect were associated with higher levels of depressive symptomatology. This appears to support previous work suggesting that mood serves as an important factor in psychological adjustment (Chang & Sanna, 2001) and well-being. High positive affect is characterized by high energy and pleasurable engagement and has been linked to positive physiological changes (Futterman, et al., 1994), better social relationships (Taylor & Brown, 1988), maintenance of conscientious health habits, and appropriate use of healthcare services (Taylor, et al., 2000). In turn, each of these variables would seem to serve protective roles in reducing the likelihood of increased depressive symptoms over time. Whereas, low positive affect is characterized by sadness and lethargy and is inversely correlated with

physical disability, cognitive problems, negative life events, and minimal social contacts (Pitkala, et al., 2004).

As expected, age was also a significant predictor of Time 10 depressive symptomatology, indicating that increasing age was significantly associated with increases in levels of depressive symptomatology, which is consistent with the literature. Increasing age is also associated with declines in physical health and function and, in general, with survival and quality of life issues (e. g., Laukkanen, et al., 2000; Scott, et al., 1997 Vaillant, 1977). In turn, age-associated increases in chronic illness and negative self-appraisals of health are predictive of lower levels of morale and a general absence of well-being (Bisschop, et al., 2004; Larsen, 1978). However, in this sample, age proved to be the least influential of the significant indicators of depressive symptomatology. Again, the timing of the data collection may play a role in this finding. Since age at baseline was the measure used as a control and the dependent variable was measured 10 years later, it is possible that the true association between the two measures was underestimated. Descriptive analyses for the original study sample at baseline, at Time 5 and at Time 10 did indicate that mean levels of depressive symptomatology for the sample increased over time. It is also possible that this sample is not representative of an average population of older adults. As stated previously, the sample in this study was somewhat more advantaged in terms of education, financial security, and health status. Additionally, as described previously, the age-segregated environment in which they reside may serve to buffer some of the deleterious effects associated with old age as well. These resources may serve to assist these aging adults in negotiating challenges often

associated with depression in the latter stages of the life course, such as social isolation, poor health care, reduced mobility and lack of recreational outlets.

### *Predicting Life Satisfaction*

The guiding hypotheses for this study also postulated that, once control variables and covariates were held constant, religiosity would be positively associated with Time 10 life satisfaction (hypothesis 1.1), and that the relationship between the two would be mediated by optimism (hypothesis 2.1). Results from the regression analyses performed here support only the first hypothesis. Religiosity demonstrated significant, though less than expected, influence in the prediction of future life satisfaction. Results indicated that individuals who reported greater levels of religiosity at baseline were more likely to report greater levels of life satisfaction at Time 10 ( $\beta = 0.15$ ,  $t = 2.81$ ,  $p < .05$ ). These findings are consistent with previous studies demonstrating a significant association between religious involvement and life satisfaction (e. g., Armstrong & Goldsteen, 1990; Cox & Hammonds, 1988; Cutler, 1976; Ellison, 1991; Hodges, 2002; Hunsberger, 1985; Koenig, George & Siegler, 1988; Kvale & Ferrel, 1988; Levin & Taylor, 1998; Morse & Wisocki, 1988; Neill & Kahn, 1999). The findings are also somewhat similar to those of Morris (1991), who found in a study with older adults that life satisfaction was best predicted by subjective health status, income satisfaction and church attendance. In the current study, health self-appraisal was also significantly correlated with Time 10 life satisfaction ( $r = .23$ ,  $p < .05$ ) as well as significant in each of the hierarchical regression models. However, total assets reported at baseline, representing financial status of respondents in this sample, though significantly correlated with Time 10 life satisfaction

( $r = .15$ ,  $p < .05$ ), were not significant in any of the regression analyses. Since the literature generally suggests that income is strongly associated with life satisfaction, it was thought that financial assets would be significantly influential in predicting future life satisfaction. Given the current trend toward great increases in cost of living expenses, this could have important implications for current and future retirees, particularly those who are faced with limited financial resources. These findings seem to suggest that financial security, in and of itself, may not necessarily predict well-being in later years.

How might religiosity influence life satisfaction? Many explanations have been suggested. For example, religious involvement may promote or facilitate social engagement, may provide a structure to help individuals find meaning and coherence in life, may facilitate the creation of a personal relationship with a higher power, and may assist individuals in coping with traumatic events, losses or life changing experiences. Perhaps, for some individuals, it is the structure of church attendance – a reason to dress up, to leave the house, and to engage with peers. For older people in particular, religious involvement may provide a place to go, a place to connect; it may provide familiar, positive memories (e. g., weddings, baptisms). For some, the church may provide a sense of belonging, a sense of being a part of a community of like-minded individuals that make up the congregation. For older adults facing the challenges of aging, religious involvement may provide a sense of stability – something that they can count on to remain consistent and welcoming – even as life changes around them. Religious teachings and beliefs may enhance resiliency by providing comfort and hope at a time when older adults are facing decline and deficits inherent in the aging process, or as they are confronted with the realities of their own mortality. They may help to define meaning

and purpose in life despite age-related declines, hardship or adversity and enable one to persevere in the face of challenges. Religious involvement has also been linked to a broad array of positive health practices and psychosocial benefits (Idler & Kasl, 1997).

Religiosity may enhance an individual's desire to practice healthy behaviors and their belief that they have responsibility for, and control over, their own healthy choices and behaviors. These factors may contribute to an increased sense of satisfaction in one's life.

The most salient predictor of future life satisfaction in this study was life satisfaction reported at baseline ( $\beta = 0.30$ ,  $t = 5.03$ ,  $p < .05$ ). Although there was a decrease in the overall mean life satisfaction levels reported for the sample at Time 1 (mean = 19.11, SD = 3.39) and Time 10 (mean = 18.65, SD = 3.63), respondents who reported higher life satisfaction at Time 1 were significantly more likely to report higher life satisfaction at Time 10. This is consistent with the generally accepted belief that life satisfaction remains relatively stable across the life span.

The data also revealed a number of unexpected nonsignificant findings. For example, marital status was not significant in any of the regression models and, once religiosity was added, living status was no longer significant. It had been expected that older adults who were married or not living alone would be significantly more likely to find satisfaction in life. It was thought that living with someone or being married would provide a number of advantages that may enhance subjective well-being, such as, providing ready access to a support system, having someone to confide in and count on in stressful or challenging times, providing an increased sense of being needed or appreciated, loved, or cared for and the opportunity to reciprocate, having a partner with whom to participate in activities, and contributing to a reduced sense of loneliness.

However, the findings here suggest that the institution of marriage, often considered protective, may not provide the same level of advantage, or remain as influential as adults reach increasingly greater ages. Perhaps for this sample of older adults, living arrangement, married or not, takes on less importance due to the ready availability of support and the closeness of neighbors and friends in their own retirement complex. Perhaps social supports and a close-knit community, such as this retirement community, provide similar protective effects as have been associated with the institution of marriage. It has been suggested that the highest levels of well-being are found among people who believe they have high levels of social support available to them (Kahn, et al., 2003). This certainly has important implications in a population that will see increasing numbers of elderly adults making retirement-living choices in the coming decades. Living alone may also force an individual to become self-sufficient and to develop other support systems, such as religious involvement, to help to meet needs otherwise associated with marriage. It might be that living alone despite the challenges associated with increasing age, or the ability to maintain independence after the loss of a spouse serves as somewhat of a “badge of honor,” representing the elderly individual’s resiliency and ability to successfully cope with adversity. This, in turn, may enhance self-esteem and a sense of mastery and lead to greater life satisfaction. Living alone also gives an individual more control over their interactions with others. For example, by allowing them greater choice over who they will interact with, and when, it may be possible to reduce stress associated with interpersonal conflict or negative interactions. Individuals who live alone also may not experience the stress that may result from having to care for an ill spouse or having to give up activities or plans in order to meet a spouse’s needs.

Another surprising finding was the lack of significant association between health and function variables and future life satisfaction. The literature has suggested that poor health and level of difficulty with Activities of Daily Living (ADLs) are associated with life satisfaction (e.g., Meeks & Murrell, 2001). Yet, although chronic conditions, IADLs, and ADLs were significantly correlated with Time 10 life satisfaction, none of these constructs demonstrated significance in the regression models. Again, this may be a reflection of the low levels of disability and high levels of health reported by the study participants. It seems likely that in this healthy sample, life satisfaction levels might be inflated due to the lack of effects from factors that are frequently associated with lower levels of well-being and satisfaction with life in the general population.

Also unexpected was the lack of significant association of the mood constructs and Time 10 life satisfaction even though both NA and PA were significantly correlated with it. Negative affect (NA) did not reach significance in any of the regression models. Whereas positive affect (PA) was significant in the first model ( $\beta = 0.13$ ,  $t = 2.24$ ,  $p < .05$ ), but failed to remain significant once religiosity was added to the model. This may be indicative of an overlap between the two constructs since empirical research has demonstrated that religion is associated with a generalized expectation that outcomes will be positive (Carver, et al., 1989; Idler & Kasl, 1992). Perhaps they are actually sharing variance in the prediction of life satisfaction, although diagnostic tests did not reveal multicollinearity issues. It is more likely an indication that religiosity is correlated with positive mood states but offers benefits above and beyond the effect of PA. It may also be another reflection of the selectivity of this sample. In general the sample reported relatively good health, moderately high levels of PA and optimism and low levels of NA.

Thus, it may be that the lack of association between mood constructs and life satisfaction was a reflection of the limited variance in the measures which resulted in somewhat of a bias toward more positive outcomes.

#### *Optimism as a Mediator in the Relationship Between Religiosity and Life Satisfaction*

What is clear from these findings is that individuals who report higher levels of life satisfaction, religiosity, and positive health self-appraisal are more likely to report greater life satisfaction in the future. In addition, it has been suggested that religiousness has an effect on life satisfaction through the influence of optimism (Salsman, Brown, Brechting, & Carlson, 2005). Regression analyses in this study did not support those findings. Although religiosity and optimism were correlated in bivariate analyses, they were not significantly associated in multivariate models that included the controls and covariates. Thus, causal steps mediational analyses were not appropriate. However, when optimism was added to the multivariate model that included religiosity, it did account for a modest (5%), but significant increase ( $F[1, 238] = 19.37, p < .001$ ) in the proportion of variance in predicting life satisfaction above and beyond the variance accounted for by religiosity, demographic variables and covariates. A Sobel Test to determine the significance of indirect effects exerted by optimism in the model failed to reach significance. Thus, contrary to expectations, these data suggest that higher levels of religiosity at Time 1 are not necessarily associated with higher levels of optimism at Time 5, but optimism is significantly associated with future levels of life satisfaction.. This suggests that individuals who are more religious, or who tend to hold a more positive, favorable outlook on life, are more likely to report greater levels of life



satisfaction. The results do not, however, support the proposition that optimism serves as one of the mechanisms through which religiosity exerts its positive influence on subjective well-being. And, since religiosity was measured with a multi-item index, it is not clear if specific dimensions analyzed individually may have produced the expected associations. As noted previously, the manner in which the constructs are operationalized and measured is likely to affect the nature of the relationship between these measures. Further, since optimism was not measured at baseline in the original study, it could not be statistically controlled in these analyses. For example, it might be that religiosity, measured at Time 5, could mediate optimism that had been measured at baseline. Thus, many questions remain unanswered. For example, it is impossible to discern if the data are really reflecting the fact that more optimistic people tend to be more religious. Perhaps the more optimistic one is, the more likely it is that they will participate in or turn to religion as an adjustment resource. Or perhaps the more religious one is, the more optimistic they become over time, or the more likely they are to hold a world view that “the glass is half full versus half empty.” Although it has been generally accepted in the literature that optimism, as a trait, remains somewhat stable across the lifespan (Shnek, Irvine, Stewart, & Abbey, 2001; Steel, & Wade, 2004), some researchers have argued that optimism is unlikely to entirely account for the effects of religiousness (Ai, Peterson, Bolling, & Koenig, 2002). For example, as a personality trait, optimism may exert its influence prior to the development of religious orientation or behavior. Regardless, in this sample of elderly adults, it does not appear that optimism serves as a mechanism through which religiosity may influence life satisfaction.

### *Resilience and Elderly Adults*

It has been suggested that the most optimal outcomes in aging are achieved through a combination of protective factors working together (e. g., Bergeman & Wallace; Rutter, 1987). An alternative interpretation might be that the most resilient individuals are those individuals who have a combination of resources that work together to enable them to adapt to change, cope with declines and deficits inherent in the aging process, and rebound or rise above adversity. The results presented here are consistent with this line of reasoning. The fact that the respondents in this study have survived to join the ranks of the old or oldest-old adults could be viewed as a testament to their resilience. Despite their advanced age, participants reported relatively low levels of health and functional difficulties as well as high levels subjective well-being, as evidenced by their reported levels of life satisfaction and low levels of depressive symptomatology. Thus, not only are they surviving into advanced old age, they appear to be thriving. The findings suggest that there are a number of factors that contribute to their resiliency. Specifically, high levels of self-appraised health, positive mood states (positive affect), their interpretation of global levels of depressive symptomatology and life satisfaction, religiosity and optimism. Thus, these findings are consistent with previous works that have suggested that resilient individuals possess some combination of internal (e.g., personality or dispositional characteristics) and external resources (e. g., social engagement, prosocial behaviors such as religious involvement) that serve as protective factors that enhance their ability to adapt more successfully to the aging process.

### *Limitations of the Study*

Although the findings of this study provide further insight into how factors may work together as resilience resources to promote greater levels of subjective well-being in older adults, there are a number of limitations to consider when interpreting the findings and drawing conclusions. The external validity of this study was limited by the lack of racial and economic diversity of the participants. Although this sample of White, moderately healthy, upper middle-class, retirement community-dwelling older adults was representative of the community-dwelling elderly in the area, the results may not be generalizable to all older populations (e.g., lower socioeconomic levels, minorities, urban-dwelling, residents who do not live in age-segregated areas) or to more infirm or institutionalized populations (e. g., chronically ill, frail, disabled, nursing home residents). For example, previous research has indicated that religious involvement may be more important to African Americans than Whites (Ellison, 1995), and that minorities, in general, are more likely to be more religious (Ferraro & Koch, 1994; Levin, Taylor, & Chatters, 1994). There are also strong indications in the literature that there are likely to be differences in outcomes based upon well-established associations between such factors as income, education, functional status and depressive symptomatology. It may also be that the factors studied here may affect younger populations differently (i.e. the young old or old versus the old-old as studied in this sample). Thus, future research is required in order to determine if the results identified here are consistent with those of a more diverse group of study subjects.

The sample in the current study was also limited due to the effects of both missing data and attrition. Respondents who were excluded due to missing data (N = 202 of the

original sample of 1000) were more likely to have reported lower levels of positive affect (PA), lower baseline life satisfaction and greater levels of IADL difficulties. Thus, those respondents included in the sample were more likely to have a more positive mood and outlook on life and fewer physical disabilities than those who were excluded from the sample. This could have resulted in an inflation of the scores for overall life satisfaction. The respondents lost to attrition reported significantly lower self-appraisals of health, PA, and life satisfaction, and higher levels of both IADL and ADL difficulties. Thus, respondents who were still in the study after 10 years demonstrated fewer risk factors associated with increased depressive symptomatology and reduced life satisfaction than those who were excluded at baseline. Future work that includes more diverse populations could greatly improve the external validity of findings. Further, the CES-D utilized to measure depressive symptomatology in this study is a non-clinical, non-diagnostic tool that relies on self-report to screen for the incidence of depressive symptomatology. Clinical assessment by trained providers or an additional measurement provided by a key observer (e. g., spouse; peer) to corroborate the patient data would strengthen the findings.

Another important consideration is the fact that the index used to measure religiosity was developed by the researcher with a series of items from the original study questionnaire. Although the index demonstrated moderate reliability (.87) (Table 1) in this study, it had not previously been validated. One might also argue that the index was heavily focused on religious coping and may have provided a less than ideal range of factors important to the study of religiosity. Use of a previously validated, widely used

scale to measure religiosity would greatly improve the generalizeability of the results and would allow for replication in future studies.

Another limitation is the self-report nature of the data used in this study. Self report may be especially problematic when reporting chronic illness, physical health and functional difficulties. Self-reports of health are the products of the individual's perception and may reflect the respondent's understanding of an illness or disability or be tempered by their perception of the severity of the illness or infirmity and may not necessarily provide an accurate, objective measure of health or disability. Self-reports may also be vulnerable to social desirability or social comparison bias. Further, the use of dichotomous categories to measure chronic conditions is limiting since it does not account for the severity or duration of the illness or difficulty (Mills, 2001). It is likely that significant association between health and function measures and the outcome variables in this study would not have been lacking if severity measures had been included in the analyses.

Another limitation that should be considered is the time between data points. The ten year spread between baseline measures and outcome measures may have led to greater levels of attrition and an under-estimation of the associations between the variables. Health and function declines and chronic illness are an inherent part of the aging process. With increasing age, there is often an increased likelihood of onset of health issues that may impact an individual's perception of the quality and meaning of life, their expectations of the future, their desire and/or ability to socialize or participate in important activities, their mood states and their general sense of well-being. It is likely that measures for the covariates taken at baseline would have presented stronger

associations with depression and life satisfaction as the levels of decline increased with age.

A further limitation in this study was imposed by the use of secondary data. When using secondary data for analyses, the researcher may be constrained by the data that are available and frequently must make adjustments in the conceptual model. In this study, it would have been preferable to have a measure of optimism at Time 1 in order to test for possible mediation effects of religiosity on optimism. Also, in order to increase the comprehensiveness of the religiosity index, measures of spirituality, prayer habits, past religious involvement or behaviors, and further indicators of religious salience, would have been pertinent additions if they had been available in the waves of data chose for analysis.

#### *Strengths of the Study*

Since this study utilized longitudinal data with multiple data points it was possible to control a number of important sociodemographic variables, initial measures of the dependent variables as well as a number of covariates that have previously been identified as possible confounders, such as positive and negative affect, health self-appraisal, chronic illness and IADL and ADL difficulties. For example, negative affect has been found to overlap with and exhibit strong influence on depressive symptomatology (Kahn, et al., 2003; Watson & Clark, 1984). Health, functional status, and mobility difficulties can undermine the association between religious involvement (e. g., attendance; activities), subjective health appraisals and optimism (Musick, 1996; Oman & Reed, 1998). Control of confounders and covariates allows for a better

understanding of the associations between study variables of interest and further explanations of the strength of their influence.

An additional strength for this study lies in the operationalization and measurement method used for the independent variable. Many earlier studies have used religious attendance as a proxy measure to represent the construct of religiosity. In the case of elderly adults, results might be skewed since the relationship between age and religious attendance is generally thought to be curvilinear – as age goes up, attendance often goes down (e.g., functional disability reduces mobility). Therefore, religiosity should be treated as a complex concept that most certainly represents more than a measure of attendance at religious services. Based upon the data that were available in the original study, a index was constructed in order to create a more comprehensive measure of religiosity. Indicators reflecting organizational religiosity, non-organizational religiosity, subjective religiosity (salience) and religious support and comfort (coping) were combined in an effort to capture an array of elements thought to be important in defining and measuring religiosity.

#### *Implications*

The findings of this study contribute to the extant literature demonstrating protective effects of religiosity and optimism for aging adults. Specifically, it has been shown that higher levels of religiosity and higher levels of optimism in retirement-community-dwelling older adults are predictive of greater future life satisfaction. Life satisfaction, in turn, has long been suggested as the most salient indicator of successful aging (Havinghurst, 1961; Rudinger, & Thomae, 1990).

Powell and colleagues (2003) have suggested that, in addition to providing religious services, religious congregations are readily available community institutions that may offer access to a broad array of inexpensive resources. Encouraging older adults to engage not just in religious services, but to participate in outreach programs and other activities offered by community congregations may be cost-effective ways of channeling resources to those who need assistance in meeting some of the challenges of aging. Congregational outreach services, such as in-home visitations, prayer lines, phone support for shut-ins, or parish nurse services, may be especially important for older adults who are challenged by infirmities and mobility difficulties (e. g., no longer able to drive) that impact their ability to attend services or access other church activities. Widely available, easily accessible educational opportunities are needed in order to enlighten community service providers, physicians, public health workers, and other providers on the links between religiosity and well-being and to encourage networking amongst potential resources. Community leaders and service providers need to develop an understanding of such concepts as religiosity and spirituality, and determine how they might be used effectively in policy and practice (Davis, 2005). Koenig (2004) has suggested that academic preparation, training, attending continuing education courses and reading the related literature are all ways of becoming informed about the religion-well-being connection. Service providers should assess their patients' / clients' level of religious or spiritual belief and functioning and its impact on their well-being (Emmons, 2005) and be cognizant of their importance in the lives of many individuals. Those who are not comfortable with these concepts should be prepared to make appropriate referrals in order to better serve their clients and avoid undermining potential resources.



In recent years researchers focused on successful aging have begun to investigate factors that protect older adults from risk situations or adverse outcomes. Some of this research has suggested that there are likely latent resources that play a significant role in helping older adults remain resilient despite the changes and declines that are inherent in the aging process (e. g., Staudinger, et al., 1993). The results of the research presented here indicate that dispositional optimism may be one such resource. For example, assessment of an individual's level of dispositional optimism may provide a means for identifying individuals who may lack an important resource to successfully adapt to challenges posed by the aging process, illness, or declines in health and functional ability. Assessment of optimistic orientation and hope may provide an important means of identifying individuals who are less likely to be resilient in the face of adversity or are at greater risk for adverse outcomes. The results here indicate that individuals with higher levels of optimism are more likely to report higher levels of future subjective well-being, which previous literature has shown to be a significant predictor of successful aging. Thus, perhaps Watty Piper's (1930) little blue engine already knew what researchers are now beginning to discover, that " I think I can, I think I can, I think I can" may be more than a child's storybook lesson. It may represent a life-long perspective that has a powerful influence on the positive aging experience of older adults.

#### *Suggestions for Future Research*

There has been increasing recognition that religiosity is associated with a number of positive physical and mental health and well-being outcomes. Consistent with previous studies, these findings suggest that religiosity is an important dimension in the lives of older adults. Growing evidence suggests that religiosity serves as an important

resiliency resource. With this has come the development of a vast array of conceptualizations, definitions and measures of religious involvement and spirituality. However, it is becoming clear that more work is needed to develop religion and spirituality measures that are theoretically and functionally linked to important facets of physical and mental health and are consistently employed in research. The literature clearly suggests that the nature of the relationship between religiosity measures and physical and mental health outcomes varies by population and by the manner in which these constructs are operationalized and assessed. More work is needed in order to determine differences and similarities between the constructs of religiosity and spirituality and their respective effects on a wide range of outcomes. Future studies that create and utilize standardized measurement and analytical techniques with a more heterogeneous sample are needed. In particular, longitudinal studies that help to elucidate the temporal manner in which these constructs relate to one another would greatly expand our understanding. Research is needed to examine the potential age differences in the effects of religiosity and the relative importance of each of the possible domains of influence. Further research is still required to uncover the mechanisms through which religiosity exerts its influence and what factors may mediate or moderate its effects. Especially pertinent to the aging population will be research that focuses on more solitary measures of religiosity, such as prayer and spirituality, which may increase in importance as mobility and social engagement become more restricted with advancing age. Given the increasing older population and concerns related to overburdening of health care and related services, subsequent research should explore the relationship between religiosity and other factors that may serve as resiliency resources for older adults. For example,

links between religiosity and social support, volunteerism, meaning and purpose in life, and various aspects of personality and self-concept such as, personal mastery, coping styles, self-esteem, and altruistic orientation. Future studies are needed to explore the vast array of potential mediator or moderator variables and identify which constructs are particularly useful in further articulating the relationship between religiosity and subjective well-being. Further, it will be especially important to consider these factors in conjunction with the various domains of religious influence as it is likely that as individuals age the importance of specific elements of religiosity will vary or change.

Extant literature on optimism clearly indicates that optimism predicts a wide array of positive outcomes in such areas as physical health and psychological well-being. The findings of this study add to the growing evidence of the importance of dispositional optimism as a resiliency resource in older adults. However, further research is needed in order to disentangle the possible overlap with other personality constructs such as neuroticism and extraversion. Longitudinal studies are needed in order to articulate the relationship between these two constructs over the lifespan and to explore the feasibility of interventions to positively impact levels of dispositional optimism. Future work should also include the exploration of the developmental origins of optimism or the determinants of optimism among older adults. If dispositional optimism is indeed stable across the lifespan, what strategies can be utilized to help sustain or enhance this orientation? Is optimism a truly a linear variable? Are overly optimistic individuals able to sustain their optimism over time, or are they less likely to have positive outcomes in the future? Gaining an understanding of how some individuals are able to maintain a sense of optimism in the face of life long challenges, the development of assessment tools for

identifying those adults who are at greatest risk of reporting low levels of life satisfaction, and the creation of interventions that can assist older adults in gaining or sustaining optimistic evaluations of their aging experience should all be goals for the future.

In the future, researchers should also continue to search for evidence as to the most valid manner in which to operationalize optimism – as a unidimensional model in which optimism and pessimism are polar opposites, or as a two-dimensional model in which optimism and pessimism are treated as two separate constructs. Further, although assessment of optimism can be done simply and with minimal cost or resources (e. g., the LOT is available in the public domain and does not require specialized scoring procedures), the development of alternative assessment strategies that do not rely entirely on self-report would be useful in establishing convergent validity.

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