

RELIGIOUS PARTICIPATION EFFECTS ON MENTAL AND PHYSICAL
HEALTH

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RELIGIOUS PARTICIPATION EFFECTS ON MENTAL AND PHYSICAL HEALTH

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The first section of the dissertation provides a review of the literature, conceptual distinctions between religiousness and spirituality, and four key hypothesized pathways identified and categorized from the literature, posited to explain the effects of religious participation on health.

The second section investigates the relationship of religious participation to physical health, mental health and depression and the mediating behavioral pathway of cigarette and alcohol use. The study focuses on a sample of 2,102 individuals followed from 1979 to 2000, utilizing data from the National Longitudinal Survey of Youth 79 (NLSY79). The main findings are the following. Cross-sectional analysis revealed a positive U-shaped relationship between religious attendance and physical health in the year 2000, controlling for sociodemographic variables of gender, race, marital status, education, number of children living in a household, work amount, and income. Attendance levels of once per week to infrequent were related to better physical health scores. Attendance among individuals of low socio-economic status (SES) was associated with better physical health compared with no attendance. African Americans reported better mental health and lower depression scores with higher attendance levels compared to no attendance; Caucasians showed the opposite trend. Examining the data longitudinally from 1982 to 2000, early attendance in young adulthood was found to be positively associated with better mental health and less depression in mid-adulthood, controlling for key sociodemographic variables. The

behavior of cigarette smoking frequency was a mediator between the relationship of religious attendance and depression, controlling for key sociodemographic variables. Alcohol abuse/dependency and heavy drinking showed evidence of mild mediation. Attendance in young adulthood was protective against alcohol abuse/dependency, heavy drinking and smoking in mid-adulthood.

In addition, the dissertation includes the development of a framework for future qualitative analysis of exploratory interviews with professionals at international humanitarian organizations on how religious beliefs and practices of a targeted population are taken into account in health projects. Major themes explored are conceptualizations of religiousness, spirituality and health, theorized mediating pathways, field experiences and institutional policies.

Overall this research provides evidence to support the relationship between religious participation and mental health, depression and physical health.

BIOGRAPHICAL SKETCH

Jennifer A. Nolan received her B.A. from Amherst College, in Amherst Massachusetts in 1992, with a major in Biology and concentration in Art History. From 1992 to 1994 she was a research assistant in the Biology Department at Amherst College. In 1997, she completed a M.S. at the University of Massachusetts at Amherst School of Public Health, with a major in Epidemiology and completed a master's thesis in psychosocial epidemiology. From 1997 to 2003, she was an instructor at the State University of New York College at Cortland, in the Department of Health Sciences and Health Education. Her Ph.D. was earned from the field of Policy Analysis and Management in the College of Human Ecology from Cornell University, Ithaca, New York, with a major in health and evaluation, and minors in epidemiology, human development, public policy, and research methods. During her graduate work, she conducted research and field experiences abroad with international humanitarian organizations in the areas of health and education. She also studied coursework in religion and spirituality at the Gregorian University and the University of St. Thomas, in Rome, Italy.

This research was born from many years of interest in religion and science, particularly in the shared common purpose of these paradigms for understanding the world and our place in it, as well as the inevitable tensions between these two paradigms. This topic has been nurtured by family and many inspiring and challenging instructors and friends along the way. The author looks forward to the surprises, challenges and discoveries in future research endeavors.

I dedicate this work to my brother and sister

James and Maureen

and to my parents

Helen and Michael Nolan

for their unconditional love and encouragement

to dream and live life to the fullest.

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This work was initiated, created and completed because of the shared vision, belief, strength and support of many people. This present work is a testament to this fact, and perhaps one of the most important lessons learned from this process.

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Much gratitude to Ezra Cornell for his foresight in founding a great university in 1865 with the motto “I would found an institution where any person can find instruction in any study.” This motto has allowed me to pursue with delight interdisciplinary studies at Cornell.

This research has not only challenged me academically but in countless other ways, particularly in broadening my conceptualizations of religion, health and science. I look forward to continuing the exploration of this topic and the insights, challenges and adventures which invariably ensue from this research.

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CHAPTER 1

Introduction

The Effects of Religious and Spiritual Beliefs and Practices on Mental and Physical Health

Motivation for this Research

Research in the area of religion and health is a newly emerging field within the social and medical sciences, and particularly in the last decade it has ascended rapidly into prominence. In the past, this topic area has been largely ignored by the medical and social science communities, mainly because of the controversial nature of the topic but also partly because the concepts of religion and spirituality are difficult to define, measure, and test using the scientific paradigm and methodology (Levin, 1994; Koenig, McCullough, & Larson, 2001).

Importance and Relevance of the Research

There is some evidence that religious participation and attendance is related to better health outcomes (Koenig et al., 2001; Bagiella, Hong, & Sloan, 2005; Hummer, Rogers, Nam, & Ellison, 1999; Strawbridge, Cohen & Kaplan 2001; Strawbridge, Cohen, Shema, & Kaplan, 1997; Rasanen, Kauhanen, Lakka, Kaplan & Salonen, 1996; Zukerman, Kasl, & Ostfeld, 1984), but why this relationship exists is yet to be fully explained. The possible pathways that might explain such associations have not been properly explored or tested (Levin, 1994; Marks, 2005; Oman & Reed, 1998; Strawbridge et al., 2001).

The overarching purpose of this research is, then, to examine the relationship between, on the one hand, religious and spiritual beliefs and practices and, on the other hand, health—particularly mental health. The second and most important purpose is to address, from a socio-cultural perspective, why this relationship exists. The potential

long-term application of this research is that, with an improved understanding of this relationship, national or international humanitarian health projects with a spiritual or religious component could be implemented or improved for a more integrative and long-lasting impact on the health of the populations being served. For underserved populations, spiritual and religious beliefs and practices are often integral to their community and culture. Health projects which take into account the local religious and spiritual beliefs of the targeted population may be more effective in their mission of health care and prevention.

Goal and Objectives of the Dissertation

Goal

The overall goal of this research is to contribute to the body of knowledge on religious and spiritual influences on health, particularly mental health. This dissertation attempts first to examine current knowledge to provide a better understanding of the relationship between religiousness and mental health, depression and physical health and determine the key hypothesized pathways to explain these effects. Second, the relationship between religious participation and mental health, depression and physical health is tested with national longitudinal data. Next, a pathway to help explain this relationship between religious participation and mental health, physical health and depression is tested. Last, this research presents a framework for exploring the current thinking among professionals at international humanitarian agencies on religious and spiritual beliefs and practices and their effects on health, within the context of humanitarian health projects. Themes explored are conceptualizations of religiousness, spirituality, and health, possible pathways of mediation, field experiences and policies.

The specific objectives underlying these goals are provided in detail as follows.

Specific objectives and their rationale

The first objective of the dissertation is to provide a review of the literature. First, a conceptual definition distinguishing religiousness from spirituality is provided. Next, a review of studies on religiousness and health is provided. Last, four key theoretical pathways are identified and categorized from approximately ten pathways found in the literature. These four pathways may provide the most plausible explanations of the association between spirituality/religiousness and health.

The second objective of the dissertation is to examine the relationship between religious factors (measured through religious attendance and affiliation) and physical health, mental health, and depression (measured mainly through the SF-12 health scale and the Center for Epidemiological Study-Depression [CES-D] score). This relationship is studied utilizing a sub-cohort from the National Longitudinal Study of Youth 1979 (NLSY79). The NLSY79 is a national representative cohort of young adults followed over two decades, from 1979 to the present, to monitor their education and career changes over time in the context of other social factors.

As part of the second objective, this dissertation tests the pathway of lifestyles and behavior to help explain the relationship between religious attendance and health. From the quantitative analysis, the behaviors of alcohol abuse or dependency, heavy drinking frequency and cigarette smoking frequency were tested as possible mediating factors in the relationship between religious attendance and health. The theory is that religious attendance may indirectly affect health through influencing lifestyle and behavior choices. Lifestyle and behaviors may then directly influence health outcomes.

The third objective of the dissertation is to provide a framework for undertaking an exploratory analysis of the ways in which religious and spiritual beliefs and practices are incorporated into health-related humanitarian projects at international agencies of the United Nations and nongovernmental organizations. Themes explored include conceptualizations of religion/religiousness, spirituality and health, hypothesized pathways, field experiences and agency policies. Researchers at these institutions have been selected as interview subjects in order to explore their thoughts and experiences on the above-mentioned themes.

CHAPTER 2

Literature Review of Dissertation

The Influence of Spiritual and Religious Beliefs and Practices on Health:
Key theoretical pathways for explaining the effects of religious and spiritual factors on
health, with a focus on mental health

Background and Justification

A critical gap in the literature within the emerging field of epidemiology of religion has been identified (Koenig, McCullough, & Larson, 2001). There is a lack of investigation and testing of hypothesized theoretical models and accompanying mediating factors to explain the effects of religious and spiritual beliefs and practices on mental and physical health outcomes. Although hundreds of studies over the past century have found an association between religion and health, most lack the testing of a hypothesized theoretical model with accompanying mediating factors to explain the correlation. If the field of epidemiology of religion is to progress and to offer a strong and lasting contribution within the social and biological sciences, more foundational work must be done to explore and test various hypothesized models and accompanying mediating factors. This review will include an overview of the field, distinctions between conceptualizations of religiousness and spirituality, discussion of the importance of mental health issues, a review of the literature on the epidemiology of religion and mental health and physical health, and hypothesized pathways to explain the relationship between religiousness and health outcomes.

Brief Overview

Epidemiology of Religion: A new emerging field

Hundreds of empirical studies since the nineteenth century have found a positive association between religion and better health (Levin, 1994; Koenig, 1998; Koenig et al., 2001). The majority of these studies over the last century examined the link

indirectly, only secondarily controlling for religious-associated variables as potential confounders or interacting variables. Such findings were often buried in tables, without comment and usually without reference to similar findings from other studies (Levin, 1994; Koenig, 1998; Koenig et al., 2001). Beginning in the 1990s, however, an association between religiousness/spirituality and health has been tested as part of the main research question or hypothesis in studies of the social and medical sciences in the new field of epidemiology of religion (Levin, 1994; Koenig et al., 2001).

Prior to the discovery of disease-carrying agents, i.e., pathogens, the history of medicine and religion were intertwined. In the past, throughout the world, the same person provided both medical and spiritual care to a patient. More recently, however, medicine has ignored spirituality and religion in patient care, reserving this function for clergy (Levin, 1994; Koenig et al., 2001; Levin & Schiller, 1987). Currently, religious and spiritual beliefs and practices are increasingly recognized as factors in patient- clinician relations and with respect to quality of life. There has been a significant reunion between medicine and spirituality (Ziegler, 1998a). Religion is now becoming accepted as having an influence on patient outcomes. The reconciliation process of religion/spirituality and health care has come about by public demand, partly because of patient's dissatisfaction with medical technology's ability to deliver the highest quality of life in treatment and recovery (Hufford, 2005; Ziegler, 1998a). For example, among cancer survivors, religion and spirituality have been found to be key components of successful long-term coping strategies (Ziegler, 1998a).

Religion/Religiousness versus Spirituality Conceptualizations

Researchers distinguish the terms 'religion' and 'spirituality.' Generally, religion implies traditional beliefs, attitudes and practices that are a part of or constitute

membership in an organization (Ziegler, 1998b). Spirituality may include elements of religion, but more generally it denotes views and behaviors that express relatedness to something greater than the self (Ziegler, 1998b). Spirituality is a component of most religions, but one may be described as spiritual without participating in formal religious membership.

During a series of conferences on religion and health, leading researchers in medicine, psychology, substance abuse, and the neurosciences had difficulty reaching a consensus on identifying appropriate conceptual overlap and distinctiveness for religion/religiousness and spirituality, one of the goals of the conference (Koenig et al., 2001; Hufford, 2005; Larson, Swyers, & McCullough, 1997). The panel noted that a barrier to research on religion and health is the lack of agreed-upon conceptual constructs of spirituality and religion/religiousness within psychological and sociological research grounded in scientific and historical scholarship (Hufford, 2005; Larson et al., 1997).

The word “religion” derives from the Latin root *religio*, which can be interpreted as a “bond between humanity and some greater-than-human power” (Larson et al., 1997). Religious scholars have noted that in modern contemporary society religion has been reduced from an “abstract process to a fixed objective entity expressed through a definable system” such as major world religions or particular denominations. Some religious scholars feel that while this reduction of religion may be useful for classification purposes, it is a “serious distortion and depreciation of religion because it overlooks the dynamic personal quality of religious experience” (Larson et al., 1997). The panel has referenced the conceptualizations of religion according to the theologian and philosopher Herschel and the anthropologist Geertz as broad enough to

include the spiritual component. Herschel believed the role of religion was to provide “cognitive insight into ultimate questions of existence” (Herschel, 1958, as referenced in Larson et al., 1997). Geertz believed that religion provides meaning to human experience and organizes conduct.

The word “spirituality” is derived from the Latin root *spiritus*, which can be interpreted as breath, or life. It is frequently mentioned in the Hebraic Old Testament (*ruach*) and Greek New Testament (*pneuma*) (Larson et al., 1997). Only recently has spirituality been separated from the context of religion. During the latter half of the twentieth century there was an increase in secularism and a disregard for religious institutions in western society. During this time, people developed a positive view of spirituality as a means for personal experience of the transcendent, and a more negative view of religion as a possible barrier to these experiences because of institutions which limited personal potential (Larson et al., 1997).

Historically, religion was considered to include both individual and institutional aspects. However, more recently there has been a polarization of the two; spirituality is often considered as the individual search for the sacred, while religion is often limited to the institutional component of this search.

The panel stresses the dangers of polarization, referring to panelist Pargament’s argument that all religions are interested in spiritual matters and that all religious and spiritual expressions are manifested in a social context. In addition, there is substantial research providing evidence that both religion and spirituality can be practiced in healthy and unhealthy ways; therefore, an argument that spirituality is good and religion is bad or (vice-versa) is not supported by the current scientific evidence.

Religion/religiousness and spirituality are not independent of each other, but are intertwined. Religiousness and spirituality often co-occur (Larson et al., 1997). Spirituality often occurs within the practice of religion, but may not. Likewise, the practice of spirituality may lead people to become religious, or it may not. Measurement of spirituality as a separate construct from religiousness is difficult; information about why an individual practices certain religious or spiritual behaviors is needed to determine whether the measure is actually capturing religiousness or spirituality (Larson et al., 1997). Until more advanced measures are developed, the panel recommends that the measures of these constructs be referred to as “religious/spiritual measures” (Larson et al., 1997).

Past attempts to define these constructs have either been too narrow or too broad, resulting in empirical research with little value. The purpose of the consensus was not to create new definitions but to produce criteria by which existing and new definitions or measures of spirituality and religion/religiousness used in research studies could be judged or assessed for their value. The researchers and scientists reached a consensus of the criterion that spirituality and religion/religiousness share, which is essentially “a search for the sacred,” as described below (Larson et al., 1997).

The feelings, thoughts, experiences, and behaviors that arise from a search for the sacred. The term “search” refers to attempts to identify, articulate, maintain, or transform. The term sacred refers to a divine being or Ultimate Reality or Ultimate truth as perceived by the individual (Larson et al., 1997).

The criteria specifically list “feelings, thoughts, experiences and behaviors” to be inclusive of various theologians’ and philosophers’ conceptualizations in the search for the sacred, including one or more the following, emphasized from the quest: emotional, intellectual, experiential and/or behavioral.

Religion or religiousness can be distinguished from spirituality by two criteria.

(1) “A search or quest for non-sacred goals (such as identity, belongingness, meaning, health, or wellness) in a context that has as its primary goal the facilitation of the search for the sacred as described above.”

(2) The means and methods (for example, rituals or prescribed behaviors) of the search that receive validation and support from within an identifiable group of people. (Larson et al., 1997)

The panel argues that religiousness and spirituality are multidimensional, and thus require as many domains as possible to measure rather than single-item measures. Using multidimensional domains will allow a researcher to obtain a more complete understanding of the relationships among religiousness and/or spirituality to health and disease outcomes. The panel has provided a list of ten key religious/spiritual domains that capture the multidimensional aspects of both religiousness and spirituality, which previous studies have shown to be related to health and disease outcomes, as listed below (Larson et al., 1997).

- (1) preference or affiliation (i.e., some religious groups promote behaviors and lifestyles linked to health outcomes, such as drinking and eating habits, use of medicines etc.),
- (2) history (i.e., upbringing, life-changing religious/spiritual experiences),
- (3) participation (attendance or time spent in church-related activities [may be considered a better measure than attendance only]),
- (4) private practices (i.e., prayer, meditation),
- (5) support (i.e., help, contact or perceived support from others),
- (6) coping (i.e., spiritual support or religious rituals for coping with stressful life events such as bereavement),
- (7) beliefs and values (i.e., may have either positive or negative implications for health [i.e. positive health implications include protecting against risky

- behaviors of alcohol or drug abuse or negative health implications include decreased self-esteem from distorted view of human nature as sinful or bad]),
- (8) commitment (i.e., amount to which one integrates spiritual/religious beliefs as basis for how to act and live),
- (9) motivation for maintaining relationships (i.e., many religious/spiritual beliefs encourage the practice of forgiveness, confession, empathy, honesty, fidelity, and altruism, which may reduce stress and promote “spiritual healing”),
- (10) experiences (i.e., religious/spiritual experiences produce a sense of wonder, peace, comfort [Larson et al., 1997]).

The panel concludes that clarification and, perhaps, new definitions and domains of religion and spirituality will evolve from multiple studies using current assessment tools and future, improved assessment tools (Larson et al., 1997).

In order to operationalize and distinguish the concepts of religion and spirituality for research purposes, each has been separately defined as described in the 2001

Handbook of Religion and Health, by Koenig, Larson and McCullough.

Religion: Religion is an organized system of beliefs, practices, rituals, and symbols designed (a) to facilitate closeness to the sacred or transcendent (God, higher power, or ultimate truth/reality) and (b) to foster an understanding of one’s relationship and responsibility to others in living together in a community.

Spirituality: Spirituality is the personal quest for understanding answers to ultimate questions about life, about meaning, and about relationship to the sacred or transcendent, which may (or may not) lead to or arise from the development of religious rituals and the formation of community.

In contrast to the panel, which tend to treat religion and spirituality somewhat interchangeably, the authors of the *Handbook of Religion and Health* have

identified characteristics which distinguish religion and spirituality, as shown in the following list (Koenig et al., 2001):

<u>Religion</u>	<u>Spiritual</u>
Group-oriented	Individualistic
Observable, objective	Less visible, subjective
Formal, organized	Informal, less organized
Behavioral, outward-oriented	Emotional, inward-oriented
Authoritarian in terms of behaviors	Not authoritarian, little accountability
Doctrine-oriented (good vs. evil)	Unifying, not doctrine-oriented

Because spirituality is difficult to measure, most studies use religious indicators such as attendance at religious services. In fact, the strongest evidence thus far in the literature to support a relationship between religion and health is the observed relationship between religious attendance and decreased mortality (Koenig et al., 2001; Hufford, 2005; Sloan, 2005). Ziegler notes that in studies comparing different religious traditions and health, no one religion has any advantage over any other in terms of better health outcomes (Ziegler, 1998b). The recently developed and pilot tested WHO Quality of Life and Spirituality, Religiousness and Personal Beliefs Survey is unique in that the questions are inclusive of various beliefs, whether religious, spiritual, philosophical, moral or scientific, including the belief that there is no higher being and that the scientific paradigm is, for example, the sole adjudicator of knowledge about the world (World Health Organization, 2002a).

Some two dozen studies of the most common religious indicator, frequency of religious attendance—measuring outcomes pertaining to hypertension, cancer,

neonatal mortality and overall mortality—support the proposition that there is a positive relationship between such attendance and health (Levin, 1994; Oman & Reed, 1998, Rosanne et al., 1996; Strawbridge et al., 1997; Zuckerman et al., 1984). The greater the level of religiousness, for example, the lower the blood pressure and the lower the rates of mortality due to hypertension, heart disease and other various chronic diseases (study populations have included Zen Buddhist priests, orthodox Jews, Catholic monks and nuns, and Baptist clergy) (Koenig, et al. 2001; Levin, 1994; Ogata, Ikeda, & Kuratsune, 1984; Friedlander, Kark, & Stein, 1987; de Gouw, Westernport, Kent, Mackenbach, & Vandenbroucke, 1995; Timio, Verdecchia, Venanzi, Gentili, Ronconi, Francucci, Montanari, & Bischisao, 1988; Locke & King, 1980 respectively). For adherents of religions with firmer and more specific behavior guidelines, such as Seventh-Day Adventists and Mormons, the risk of chronic diseases such as hypertension, stroke, and cancer is lower, and mortality rates are lower (Koenig et al, 2001; Levin, 1994; Brathwaite, Fraser, Modeste, Broome & King, 2003; Fraser, 1999; Fraser & Shavlik, 2001; Enstrom, 1989; Merrill & Lyon, 2005 respectively).

Mental Health:

Background on Prevalence and Contribution to Global Burden of Disease

Approximately 450 million people worldwide are affected by mental, neurological or behavioral problems. The number suffering from depression at any given time is 330 million, with prevalence rates of two to three percent for men and five to twelve percent for women (Smith, McCullough, & Poll, 2003). During 1993 and 1994 there were 20 million visits to physicians' offices that involved depressive symptoms. In addition, depressive symptoms lead to twelve billion dollars lost in American labor each year. (Smith et al., 2003). In the United States, about one in five (22.1%), or 44.3 million Americans aged 18 and older, suffer from a diagnosable mental disorder in a

given year (American Psychiatric Association, 1994). Almost half of the leading causes of disability in the U.S. and other developed countries (four out of ten) are mental disorders, including major depression (the leading cause of disability), bipolar disorder, schizophrenia, and obsessive-compulsive disorder (Murray & Lopez, 1996). About 9.5 percent of Americans aged 18 and older (18.8 million) have a depressive disorder for any given year (NIMH, 2001). Twice as many women (12% or 12.4 million women) as men (6.6% or 6.4 million men) are affected by depressive disorder each year in the U.S, with symptoms appearing at earlier ages than in decades past (NIMH, 2001). Over two million individuals (1% of the U.S. population) are affected by schizophrenia, with similar statistics for bipolar disorder (NIMH, 2001), the two disorders afflicting men and women with equal frequency. Depression and schizophrenia are the leading causes of disability worldwide (Murray & Lopez, 1996; Ustun, 1995).

Most mental illnesses lead not to mortality but rather to disability over many years. For example, a schizophrenic diagnosed in the late teens or early twenties can expect to be disabled for the remainder of her or his life, usually decades long, unless the disease is closely managed with consistent medication and therapy. Such a condition interferes with an individual's ability to hold steady employment and to be a productive member of society. For many with mental illness, compliance with treatment and medicinal regimes is very difficult, especially considering the stigma of living with the illness. In most countries, there are major barriers to both the care and reintegration of people with mental disorders (WHO, 2002b).

The global burden of psychiatric conditions has been severely underestimated. Half of the top ten leading causes of disability (measured as years lived with a disability) are

mental illnesses (Brundtland, 2001). The incidence of mental illness is increasing at a dramatic rate in developing countries and is projected to increase considerably into the twenty-first century (Murray & Lopez, 1996). Unipolar depression is expected to be the leading cause of disease burden globally in developing countries by 2020, and it is estimated to be the second leading cause for all countries (Murray & Lopez, 1996). The high incidence of mental illness is directly linked to global health issues related to poverty, war and conflict, discrimination, aging, rapid change from urbanization, economic development, and environmental degradation (Brundtland, 2001).

International humanitarian organizations have a priority interest in mental health issues. For example, the World Health Organization (WHO) has conducted some of the most comprehensive international studies of mental health issues, in collaboration with Harvard University and the World Bank (Murray & Lopez, 1996). The former director general of WHO, Dr. Gro Harlem Brundtland, places mental health issues among the more critical global public health problems under WHO's purview (Brundtland, 2001).

Most mental illnesses are chronic or recurring in nature; therefore, improving the quality of life is a focus of current research, such as the World Health Organization Quality of Life and Spirituality, Religiousness and Personal Beliefs Global Study. In this worldwide effort, WHO is examining the effects of religious and spiritual beliefs and practices on quality of life in diverse cultures (WHOQOL SRPB Group, 2005).

Social and medical researchers place increasingly greater importance on understanding the role that socio-cultural factors, particularly religious and spiritual beliefs and

practices, have on mental health. An understanding of these factors may be better utilized to improve mental health within various populations.

Effects of Religious Factors on Mental Health: Summaries of Findings

Many studies particularly in the past, ignored conceptual and empirical associations between mental health and religion. In 1986 the *American Journal of Psychiatry* published a systematic analysis of 2,348 quantitative research articles published in four leading psychiatric journals between 1978 and 1982. It was found that only 59 included a quantified religious variable (Levin & Chatters, 1998; Larson, Pattison, Blazer, Omran, & Kaplan, 1986). The four psychiatric journals reviewed were the *American Journal of Psychiatry*, the *British Journal of Psychiatry*, the *Canadian Journal of Psychiatry*, and the *Archives of General Psychiatry*. Of these 59 articles, only 3 included religion as a major emphasis of study, while 37 of the studies used a single weak measurement of denomination only. The authors of the review contend that the lack of research on religion and health in psychiatry was attributable to a bias in the psychiatric field against conceptual and empirical testing of the association between religion and mental health. The authors noted that “religion has a minimal place in psychiatric theory of human behavior” (Larson et al., 1986) and argue that the substantial religious orientation of the population in the United States, with more than 90 percent professing a belief in God and more than 40 percent attending religious services weekly or more often, render the “psychiatric understanding of religion in normality and psychopathology” clinically necessary (Larson et al., 1986).

In a 1992 follow-up of the 1986 review article, Larson et al. assessed all quantifiable religious measures from all research articles published in two of the leading psychiatric journals (the *American Journal of Psychiatry* and the *Archives of General*

Psychiatry) during the period from 1978 to 1989 (Levin & Chatters, 1998; Larson, Sherrill, Lyons, Craigie, Thielman, Greenwold, & Larson, 1992).

All religious measures were categorized according to one of six dimensions measuring religious commitment: 1) ceremony (participation in religious ceremonies or rituals), 2) meaning (purpose, values, beliefs, and ethics), 3) social support (use or influence of social support), 4) prayer, 5) relationship with God, and 6) indeterminate (use of term “religion or religiousness” with no specification) (Larson, 1992).

Measures of denomination, often used as measures of religion in earlier studies, were excluded. Measures of denomination were considered “static” because they did not measure the “diverse range of religious styles and practices within such broad categories” (Larson et al., 1986). Denomination was considered a poor and ineffective measure of religiousness, whereas religiousness was considered more “dynamic,” as it assessed religious commitment through questions about religious beliefs, practices and attitudes, as described previously (Larson et al., 1986). Multiple questions about religious commitment were considered a better measure to capture the multidimensional aspect of religiousness, rather than a one-dimensional measure (single question) of religiousness.

There were 139 religious commitment measures in all published articles in the two psychiatric journals from 1978 to 1989 (Larson et al., 1992). For the majority (78%) of these measures, no hypothesis was tested. For more than half (64%) of these measures, there was no reporting of any associations—whether neutral, positive, or negative—between a religious commitment variable and a mental health outcome (Larson et al., 1992). For the 36 percent of the studies (50 out of 139 studies) that reported an

association between religious commitment and mental health, 36 studies (72%) reported a positive association, 8 a negative (16%) and 6 a neutral association (12%) (Larson et al., 1992). Regarding dimensional measures of religious commitment, four of the six dimensions (ceremony, social support, prayer and relationship with God) showed positive associations with mental health (24 out of 26 studies, or 92%). The other two religious dimensions, meaning and indeterminate dimension, accounted for seven of the eight negative findings and accounted for five of the six neutral findings. The authors note that future research must more carefully investigate why the dimension of religious meaning consistently provides negative associations with mental health, while the other dimensions consistently produce positive associations. A possible explanation of the authors was that individuals with high scores for religious meaning but low participation levels “could experience this incongruity as personal conflict,” which could result in negative mental health outcomes (Larson et al., 1992).

Beginning in the 1990s, theory and research have addressed these issues in a more thorough, methodical manner. Research in the areas of epidemiology, social sciences and clinical practice has contributed to the development of a new field—the epidemiology of religion (Levin & Chatters, 1998). In a recent critique on the current state of the field, Hufford writes that public demand for the reconciliation of religion/spirituality and health care has had powerful, sweeping political ramifications from “the National Institutes of Health to university faculties to the process of peer review in scientific and medical journals” (Hufford, 2005). He stresses that “the question cannot be *whether* religion/spirituality should be studied, but must rather be *how* the topic should be studied” (Hufford, 2005). To reflect the growing research interest in this area, since 2000 journals such as *Psychiatric Annals*, *American*

Behavioral Scientist, Public Policy and Aging Report, International Review of Psychiatry, American Psychologist, and the Southern Medical Journal have devoted entire issues to the research field of religion and mental health (Harold G. Koenig, Director of the Center for the Study of Theology, Spirituality and Health at Duke University Medical Center, personal communication, Fall 2005).

During the past decade as the number of studies on religion and health have increased, researchers have documented positive associations between measures of religion and mental health outcomes. Beneficial effects of religious involvement have been found for various mental health outcomes such as well-being, hope, optimism, purpose and meaning in life, depression and its recovery, anxiety and fear, suicide, delinquency, and substance abuse (Levin & Chatter, 1998; Koenig, McCullough, & Larson, 2001; Baetz, Griffin, Bowen, Koenig, & Marcoux, 2004; Larson & Larson, 2003; Strawbridge et al., 2001).

Koenig, McCullough, and Larson reviewed 101 studies on the relationship between religious involvement and depression, 8 of which were clinical trials (Koenig et al., 2001). Among the 93 cross-sectional or prospective studies, 60 (65%) reported lower rates of depression with higher religious involvement. No association was found in 13 of the studies. Higher rates of depression with higher religious involvement were found for 4 of the studies, and 16 studies reported mixed findings (Koenig et al., 2001). Among the 22 prospective cohort studies, 15 (68%) found that higher rates of religious involvement were predictive of lower rates of depression over time. Last, among the 8 clinical trials, 5 of the studies showed that those exposed to religious involvement recovered significantly faster than those not exposed (Koenig et al., 2001).

However, research on the relationship between religiousness and mental health outcomes has not kept pace with that on physical health outcomes (Hufford, 2005). Many of the studies on mental health have been conducted within studies on physical health, for example, elderly people coping with chronic disabilities or others coping with physical illness (Hufford, 2005). Results have consistently shown that religious involvement helps the aged and ill to cope with and experience psychological growth from negative health experiences (Koenig et al., 2001; Hufford, 2005). The relationship between religiousness and serious mental illness has been less studied thus far (Hufford, 2005). For example, a prospective cohort study of hospitalized medically ill males from North Carolina documented the possible therapeutic value of spirituality. For patients readmitted to a facility within six months, “religious coping” was the only predictor variable of fewer depressive symptoms, based on self-rated depression scales (Koenig, Cohen, Blazer, Pieper, Meador, Shelp, Goli, & DiPasquale, 1992, referenced in Levin & Chatter, 1998).

For depression, and its relationship to participation in organizational religious activities, most studies have found an inverse relationship (Koenig et al., 2001). Koenig and colleagues reviewed cross-sectional studies published from 1981 to 1999 and found over 85 percent reported fewer depressive symptoms among the more religiously active (Koenig et al., 2001). In addition, individuals with higher levels of religious participation were less likely to be diagnosed with depressive disorders. Longitudinal studies also reported similar findings to those of the cross-sectional studies (as reviewed in Koenig et al., 2001).

Koenig, McCullough, and Larson note that the inverse relationship of religious participation and depression has been found in most studies despite the limitations of

the use of the religious participation variable. Although religious participation is a variable which is easily available in many large surveys, it has limitations. For example, the variance of responses is not large because in most studies nearly half of people report attending religious services on a weekly basis (Schmidt, 1996, as referenced in Koenig et al., 2001). In addition, information about those who are physically unable to attend but who are highly religious cannot be captured adequately by only using a religious participation measure.

A cross-sectional national Canadian study on spiritual and religious involvement and depressive symptoms found that those with higher levels of attendance reported fewer depressive symptoms, controlling for demographic, social and health variables (Baetz et al., 2004). However, those who stated that spiritual values or faith were important or perceived themselves to be spiritual or religious reported higher levels of depressive symptoms (Baetz et al., 2004). The authors note that longitudinal studies are “needed to help elucidate mechanisms and the order and direction of effects” (Baetz et al., 2004).

A longitudinal study of religious involvement and depressive symptoms over a six-year period was conducted on a sample of 1,840 older adults in the Netherlands (Braam, Hein, Deeg, Twisk, Beekman, & Van Tilburg, 2004). The findings suggested that there was a consistent inverse relationship over time between attendance and depressive symptoms in older Dutch citizens, as well as in those with functional limitations, controlling for demographics and physical health (Braam et al., 2004). For those who were widowed or not married, slightly higher depressive symptoms had been found with high levels of orthodox beliefs (Braam et al., 2004).

Effects of Religious Factors on Physical Health: Summaries of Findings

Most studies of religious attendance have evaluated health outcomes in terms of lower mortality rates (Hummer et al., 1999; Oman & Reed, 1998; Sloan, 2005; Strawbridge et al., 1997; Strawbridge et al., 2001; Zukerman, Kasl, & Ostfeld, 1984). One of the most noted studies on the effects of religious attendance on health was conducted by Strawbridge. The study followed the association between frequent attendance and mortality over twenty-eight years, among over 5,000 respondents (Strawbridge et al., 1997). Frequent attenders had lower mortality rates than did non-attenders. The frequent attenders were more likely to cease smoking, increase exercise, increase social contacts and remain married. The lower mortality rates observed among those who participated in religious activities more frequently were explained in part by these differences in personal and social behaviors (Strawbridge et al., 1997).

A six-year follow-up study of 3,968 older adults residing in a community in North Carolina on religious attendance and prolonged survival was conducted by Koenig and colleagues (Koenig, Hayes, Larson, George, Cohen, McCullough, Meador, & Blazer, 1999; Koenig et al., 2001). The study found that older adults, particularly women, who attended religious services once per week or more, survived longer than those who attend less frequently, controlling for demographics, health conditions and practices and social support.

Studies have consistently found that women appear to benefit more from higher levels of attendance than do men (Strawbridge, 2000; McCullough & Laurenceau, 2005).

Negative Effects of Religious Beliefs and Behavior on Health

Most studies of religion and health thus far have focused on the positive aspects of religiousness associated with better mental well-being or the ability to cope with

mental illness. Fewer studies have focused on the negative aspects of the effects of religiousness on mental or physical health. The following sub-section highlights some of the main findings and measurement issues concerning possible negative effects of religiousness on mental health, from a meta-analysis study conducted by Smith, McCullough, and Poll published in 2003.

Religiousness and Depression: Positive and negative results

Among the most recent and comprehensive studies examining the relationship between religiousness and mental health was a meta-analysis of 147 independent studies (with a total sample size of 98,975) that showed a correlation of -0.96 between religiousness and decreased depressive symptoms across all the studies (Smith, McCullough, & Poll, 2003). The 147 studies covered by the meta-analysis included published papers (about 75 percent of the total) and unpublished studies and dissertations (about 25 percent) on religiousness and depression. Most of the studies were published between 1990 and 2000 in the fields of psychology or medicine and were cross-sectional designs, using convenient samples of adults, with most samples comprising between 50 and 1000 individuals (Smith et al., 2003).

For the meta-analysis study, religiousness was defined broadly as any attitude, belief, motivation, pursuit, or behavior involving spiritual or religious content or processes (Smith et al., 2003). The authors conceptualized both religiousness and spirituality to refer to an individual's search for the sacred. Religiousness was distinguished from spirituality by its focus on group or social practices, while spirituality focuses on personal experiences and beliefs [Smith et al., 2003]). Some studies in the meta-analysis measured a cluster of symptoms associated with depressive disorder and related categories, dividing participants into depressed and not-depressed categories on the basis of psychiatric diagnoses or cut-off scores (Smith et al., 2003). Studies that

measured only broad measures of mental health, such as life satisfaction, loneliness, or suicidal contemplation, were not included in the meta-analysis.

The meta-analysis found that increased religiousness was mildly associated with fewer depressive symptoms, with a stronger association in individuals exhibiting a higher level of stress resulting from recent life events. The association of religiousness and decreased depressive symptoms was present across age, gender and ethnic groups (African Americans, European-Americans, and Northern Europeans) (Smith et al., 2003).

Of particular note, the study showed that depressive symptoms increased or decreased according to type of religiousness. Religiousness that was associated with higher levels of depressive symptoms comprised two types: extrinsic and negative religious coping (Smith et al., 2003). This finding contrasts with those of a positive association of intrinsic religious orientation with a decrease in depressive symptoms and of a positive correlation of religious coping with a decrease in depressive symptoms.

Extrinsic religious orientation indicates the extent to which an individual is involved in religion for self-seeking ends; intrinsic religious orientation indicates an individual's motivation to be religious for its own sake (Smith et al., 2003). Negative religious coping indicates an individual's coping with stress by "engaging in counterproductive religious behaviors," for example escaping from life challenges or responsibilities through excessive engagement in religious activities, blaming God for one's problems or anger at God for one's suffering (Smith et al., 2003). This finding suggests that future research should focus on an individual's particular type of religious motivation and coping style in order to observe differential effects on mental

health outcomes. In addition future research could explore whether certain mental health conditions drive, to a certain extent, the individual's religious motivations and coping styles.

The author of this particular meta-analysis notes that although the overall correlation of religiousness with decreased depressive symptoms was small, -0.96 (meaning that measures of positive religiousness explain about one percent of the variance in severity of depressive symptoms in the population), it was not "trivial" (Smith et al., 2003). For example, the relationship between gender and depression (women tend to have more depressive symptoms than men) is also statistically small, about 1.0. Yet this statistical finding has been an impetus for significant theoretical advances in the understanding of depression (Smith et al., 2003).

Recommendations for Future Research:

For this particular meta-analysis, the authors found over one hundred published studies that assess positive aspects of religiousness and only about 31 studies that assess negative aspects of religiousness in terms of either extrinsic religious motivations or negative religious coping (Smith et al., 2003). As relatively few studies have explored negative associations, more studies are recommended to further substantiate these negative findings.

In addition, future research is needed to better understand the mechanisms underlying the relationship between religiousness and depressive symptoms and other mental health outcomes. Hypothesized theoretical pathways and mediating factors will be addressed in the following section of this literature review. More theoretically grounded studies should focus on the mechanisms of causality, to aid in understanding the psychological and social aspects that support the "modest but robust association"

between religiousness and depression and other mental health outcomes (Smith et al., 2003). As previously mentioned, depending on the measure of religiousness, the association with depression is either positive or negative (a positive association for intrinsic religiousness and beneficial aspects of religious coping, but a negative association for the extrinsic and maladaptive coping aspects of religiousness) (Smith et al., 2003).

Conceptualization and Measures of Religiousness and Spirituality: Areas for Growth Needed

Global measures of religiousness and spirituality have found overall positive associations with mental and physical health. In the interest of advancing the field, however, more specific and diverse measures of religiousness and spirituality must be utilized to better address the complexity of these concepts as noted in an article by Hill and Pargament published in 2003. Hill and Pargament argue that these measures should be “theoretically and functionally linked to mental and physical health” to distinguish populations that are confronted with the stressors in question (Hill & Pargament, 2003, pp. 71-72). For example, religious/spiritual struggle is an inherent part of the process of spiritual growth found in most religious or spiritual traditions. Spiritual struggles can have either positive or negative effects on mental and physical health outcomes. Hill and Pargament note that the negative religious coping side of these struggles has been associated with a number of psychological distresses such as depressive symptoms, anxiety, suicidal thoughts, and poorer quality of life (Hill et al., 2003; Ano & Vasconcelles, 2005; Boscaglia, Clarke, Jobling, & Quinn, 2005; Exline, Yali, & Sanderson, 2000; Fitchett, Murphy, Kim, Gibbons, Cameron, & Davis, 2004; Pargament, Smith, Koenig, & Perez, 1998). In addition, they note that for negative physical health consequences, religious/spiritual struggles have been predictive factors for longer hospital stays, compromised recovery of activities of daily living, and

greater risk of mortality (Hill et al., 2003; Berg, Fonss, Reed, & VandeCreek, 1995; Fitchett, Rybarczyk, DeMarco, & Nicholas, 1999; Pargament, Koenig, Tarakeshwar, & Hahn, 2001; Pargament, Koenig, Tarakeshwar, & Hahn, 2004). In contrast, Hill and Pargament credit the positive implications of these struggles to include stress-related growth, spiritual growth, open-mindedness, and self-actualization (Hill et al., 2003; Ano & Vasconcelles, 2005; Calhoun, Cann, Tedeschi, & McMillan, 2000; Joseph & Linley, 2005; Pargament, Koenig, & Perez, 2000; Ventis, 1995). Hill and Pargament note that such religious/spiritual struggles function as a critical point of departure for either positive religious/spiritual and personal growth or negative mental and physical health, depending on how the individual is able to come to terms with his or her religious/spiritual struggle (Hill & Pargament, 2003).

Hill and Pargament emphasize that heightened sensitivity to cultural characteristics is critical to improving the conceptualization and measurement of religiousness and spirituality. Most studies have been limited to sample populations of a Judeo-Christian background. This limits the generalizability of the results. They illustrate the point by noting that studies in the United States have over-represented Protestants, and thus have over-represented Caucasians, the middle class, and males (Hill & Pargament, 2003). Future studies should reflect diverse cultures and ethnicities, such as African American and non-Western religious and spiritual traditions. In order to be more inclusive, Hill and Pargament recommend that researchers be particularly sensitive to the content and meaning of words in the survey questions, in order to detect and distinguish the nuances of various beliefs, and to control for subtle religious biases within the measure (Hill & Pargament, 2003).

Other review articles have noted that current research on religion and health, as well as psychological research more generally, fails to account adequately for the beliefs and practices of atheists and agnostics (Kier, 2004), possibly leading to the erroneous conclusion that individuals not affiliated with or identifying with a religious group are not spiritual, and that only theists are to be considered spiritual (Rayburn, 2004).

It is also important to note that many studies have reported that women benefit more than men from attending religious services and volunteering to help others, thereby scoring significantly higher in terms of caring for others (Rayburn, 2004). An increasing number of women are, however, critical of organized religions for being “biased and repressive towards women” (Rayburn, 2004). Future research should be sensitive enough to detect these struggles, which may be present for various sub-groups within organized religions.

Pargament (2002b) makes the important and distinctive point that research questions need to better address the complexity of conceptualizations of religiousness and health associations. Religion involves complex processes with the potential for both positive and negative health consequences. Pargament provides examples of negative outcomes from a study he conducted and published in 1979 to illustrate his point. He compared four groups of church and synagogue members on measures of mental health (Pargament, Steele, & Tyler, 1979; Pargament, 2002b). The frequent attendees with low intrinsic religious motivation (measured using the Intrinsic Religious Motivation Scale) showed significantly lower levels of mental health than the other three groups (the other three groups were categorized as (1) high frequency of religious attendance with high intrinsic religious motivation, (2) low frequency of religious attendance with high intrinsic religious motivation, and (3) low frequency of

religious attendance with low intrinsic religious motivation). This finding may appear to conflict with the well established finding that high frequency of religious attendance is a main indicator of better health, particularly of increased longevity. But Pargament's subtle finding reveals instead a form of "religious hypocrisy," or "failure to practice what is preached" (Pargament, 2002b, p. 177). This form of "religious hypocrisy" may not be detected by examining the frequency of attendance alone (Pargament, 2002b, p. 177).

Studies have shown that private religious coping is associated with increases in depression, particularly in situations of high stress and low control (Bickel, Ciarrocchi, Sheers, Estadt, Powell, & Pargament, 1998, referenced in Pargament, 2002b; Hummer, Ellison, Rogers, Moulton, & Romero, 2004). Pargament contends that the research question needs to be refined to investigate "how helpful or harmful are particular forms of religious expression for particular people dealing with particular situations in particular social contexts according to particular criteria of helpfulness or harmfulness" (2002b, p.168). In addition, Pargament insightfully states that "not everyone experiences the same benefits from religion. Religiousness is more helpful to more socially marginalized groups (i.e., older people, African Americans, women, poor people) and to those who are more religiously committed." (2002b, p. 178).

Hill and Pargament note that not only do measures of religiousness and spirituality as an independent variable need to be more carefully considered and measured, but the outcome variables of physical and mental health need to be reassessed, as they may function as limiting variables in this type of research (Hill & Pargament, 2003). In the case of most spiritual or religious practices, the primary goal is not necessarily improved mental and physical health, but rather spiritual health and well being, (with

better physical and mental health obtained often as secondary effects; Hill & Pargament, 2003). Thus research studies may need to address outcome measures of spiritual well being, in addition to or rather than offering only physical or mental health outcome measures. Hill and Pargament illustrate the point with this example; if an individual resigns herself to the outcome of an illness as a product of the will of God, the individual may be measured with a high score on spiritual well being while at the same time rating very low in terms of physical health (particularly if the individual's illness is not improved over time; Hill & Pargament, 2003).

Another major problem of religion and health research is misuse of the results for political purposes (Miller & Thoresen, 2003, 2004; Kier, 2004). Certain fundamental religious groups may use the research to justify prejudice and discrimination. It is possible, for example, to use the research to support the misleading claim that religious or spiritual people are healthy and, thus, that nonreligious or nonspiritual people are unhealthy (Kier, 2004). To address this potentially biased interpretation of the results, one solution is to define spirituality in a way that does not exclude any group (Miller & Thoresen, 2004). Measures of spirituality should use a multidimensional construct, in which individuals are located along a continuous spectrum, from atheists to believers of any particular religion (Miller & Thoresen, 2004).

It is also important to be cautious in making recommendations at the clinical level based on epidemiological research findings in this emerging field of religion and health. Some with ethical concerns argue that recommending religion to patients may be coercive (Sloan & Bagiella, 2001). Studies have shown that marital status is strongly associated with health effects. Physicians do not, however, make marital

recommendations to their patients based on this research, and some feel that the same argument could be made for issues of religiousness/spirituality. Such issues are personal and private, and should not be addressed by clinicians to their patients, even if research demonstrates plausible associations (Sloan & Bagiella, 2001).

In summary, evidence of negative associations between religiousness and health, although based on fewer studies than the many that show a positive relationship, supports the reframing of research questions and the conceptualization and measurement of religiousness and spirituality in a way that is more sensitive to and inclusive of the nuances and subtleties of the complexity of religiousness and the possible outcome measures for mental and physical health. Future research should include religions other than Judeo-Christian religions, spiritual and religious practices of diverse ethnic groups, and those not affiliated with a traditional religious group such as atheists and agnostics. Research should address the motivation to take up religious or spiritual practices (intrinsic versus extrinsic) associated with types of coping (positive and negative) in particular situations (in terms of stress and control) in which religious or spiritual practices and beliefs are utilized.

Epidemiological Constructs or Theoretical Framework for Understanding Religion's Effect on Health—A New Theoretical Framework is Required

Although the findings are mixed and debatable, religious participation or attendance appears to function as a protective or therapeutic factor mainly for positive health (Levin, 1996). In a 1996 article published in the *Social Science and Medicine Journal*, Epidemiologist Jeffrey Levin proposed that in order to better identify mechanisms or pathways leading to positive health, an epidemiological framework that is an alternative to pathogenesis is required (Levin, 1996; Antonovsky, 1987). Rather than using the natural history of “disease,” researchers could use the natural history of

“health” as a framework within which to conceptualize pathways and mechanisms through which a protective factor increases the probability of attaining positive health (Levin, 1996; Antonovsky, 1987).

In the psychiatric epidemiology of religion, a salutogenic view makes it necessary to determine appropriate corresponding mediating factors to help explain why religion is beneficial to health. The WHO Quality of Life (WHOQL) study is a good example of the use of a salutogenic model. The WHOQL does not measure ill health or disease and disability only, but rather studies positive health outcomes that enhance or contribute to improved quality of life, evaluated in various domains, such as physical health, psychological health, level of independence, quality of social relationships, environment, and spirituality (WHOQOL Group, 1998).

Causal Mechanisms that Explain Religion’s Effects on Health

A variety of possible hypothesized pathways and mediating factors have been proposed within the salutary construct in the natural history of health framework to explain the mechanism through which religion affects health, as proposed by Levin (Levin, 1996; Antonovsky, 1987). Levin has listed approximately ten possible pathways (Levin, 1996). From these ten, four main pathways have been selected and regrouped as described below. One of these pathways will be explored in the quantitative section of the dissertation.

Behavior or Lifestyle Pathway:

Behavior yields a possible hypothesis explaining the effect of religion on health.

Religious commitment may affect health through fostering health-related behaviors or lifestyles that improve well being (Levin, 1996; Merrill & Thygeson, 2001; Powell, Shahabi, & Thoresen, 2003; Strawbridge et al., 2001). Certain religions promote

healthy behavior, such as abstaining from alcohol, tobacco, and meat, and avoidance of physical health risks in general. For example, the Seventh Day Adventists and Mormons have lower rates of morbidity and mortality than other groups that do not abstain from some of these lifestyle behaviors (Levin, 1996; Brathwaite et al., 2003; Enstron, 1989; Fraser, 1999; Merrill & Lyons, 2005). Previous studies have found a protective effect of religious attendance against such risky behaviors as alcohol use and cigarette smoking (Koenig, George, Blazer, & Ford, 1994; Whooley, Boyd, Gardin, & Williams, 2002; Hummer et al., 1999). The behavior pathway will be tested in the quantitative section of the dissertation. The behaviors associated with alcohol abuse or dependency, heavy drinking frequency and cigarette smoking frequency will be tested as possible mediators to help explain the relationship between religious attendance and outcomes of physical health, mental health and depression.

Social Support Pathway:

Sociological explanations have been proposed to elucidate the effect of religious dimensions on mental and physical health (Levin, 1996; Koenig et al., 2001; Hummer et al., 2004; Levin & Chatters, 1998; Strawbridge et al., 2001). Religion appears to buffer the impact of stress on health by offering a social support network. Social relationships of high quality and, sometimes, high quantity protect against morbidity and mortality because such relationships mitigate the negative effects of stress or other health risks and help an individual to adapt to stressful situations (House, Landis, & Umberson, 1988). Lack of social relationships is a major risk factor for poor health, “rivaling the effects of well established health risk factors such as cigarette smoking, blood pressure, blood lipids, obesity, and physical activity” (House et al., 1988, p. 541). Social relationships are thought to affect health because they promote a sense of meaning, and/or promote health behaviors such as proper diet, exercise, medical care, limitations of alcohol, cigarettes, drugs (House et al., 1998). Religious participation is

usually measured by attendance at religious services. This participation may help to develop “meaningful social relationships in terms of quality and quantity and integration into supportive networks that may provide emotional support” (Levin & Chatters, 1998, p. 40).

Psychodynamics of Ritual/Belief/Faith Pathways

Levin states that the psychodynamic beneficial effects of emotional release during religious worship and/or prayer are believed to be associated with healing and well being, as a type of emotional placebo (Levin, 1996; Levin & Chatters, 1998). Positive emotions, such as love, hope, forgiveness, and self-esteem, which may be nurtured by the practice of spiritual or religious activities such as prayer, may influence mental health (Levin & Chatters, 1998; Hill & Pargament, 2003; Ray, 2004; Rossi, 1993). Religious beliefs or worldviews particular to specific religions may affect mental health by encouraging healthful beliefs or personality styles such as the practice of ethical behavior or the acceptance of responsibility and consequences for one’s actions (Levin & Chatters, 1998; Spector, 1979, as referenced in Levin & Chatters, 1998).

Belief systems influence the mind, and the mind influences the body and its health (Ray, 2004). Religious beliefs and practices may influence one’s beliefs and thought, which in turn may change the brain, which is the body’s initial line of defense against illness. “Changing thoughts imply a changing brain and thus a changing biology and body” (Ray, 2004, p. 29).

Multifactorial Effects Pathway

Levin proposes that perhaps the relationship between religion and health may not necessarily be explained through only one pathway but perhaps through multiple pathways (Levin, 1996; Levin & Chatters, 1998). Most sociological and biological

phenomena are caused by exposure to multiple factors through multiple pathways (Levin, 1996; Levin & Chatters, 1998). Exposure to multiple factors through multiple pathways may contribute to the effects of various religious and spiritual factors on mental and physical health outcomes (Levin, 1996; Levin & Chatters, 1998). For example, the finding that Adventists have lower hypertension-related morbidity may be related to their vegetarian-based diets, strong social networks from family and religious participation, and faith, optimism, and peace from belief in a higher being's care for them (Levin, 1996; Levin & Chatters, 1998; Koenig et al., 2001).

Future research needs to test these possible mediating pathways to better understand the observed link between religious/spiritual beliefs and practices and health. The important and yet-unanswered question in the field of epidemiology of religion is “*why* do religious and spiritual beliefs and practices appear to influence health?” (Levin, 1996; Levin & Chatters, 1998; Koenig et al., 2001). In addition to showing evidence of an association between religious attendance and health, the quantitative section of this dissertation attempts to address this “*why*” question by testing the mediating pathway of behavior, through the specific mediators of alcohol abuse and dependency, frequency of heavy drinking, and frequency of cigarette smoking.

Last, an alternative view is that there is not necessarily one or multiple mediating pathway(s), but perhaps rather that there is a simple, direct relationship between religiousness and health. Religion is a “distinctive human dimension that carries meaning and power in and of itself” (Pargament 2002a, p. 239). Mediating pathways may indirectly serve “to explain religion away,” when in fact religion in itself may be the direct route to influencing mental and physical health outcomes (Pargament 2002a, p. 239).

In summary, there are still many queries in the field of religion and health that require further exploration. Some of these hypotheses are investigated in this research, which include whether the relationship between religious participation and physical health, mental health and depression holds in a U.S. national dataset among adults, cross-sectionally and over time, and whether the mediating pathway of lifestyle and behaviors through the behaviors of cigarette frequency, alcohol abuse or dependency and heavy drinking, are possible explanatory pathways for the observed relationships between religious participation and health.

CHAPTER 3
Objectives and Methods
Quantitative Study

Relationship between religious attendance and physical and mental health and depression among adults, explored cross-sectionally, over time, and through the mediating pathway of behavior, utilizing the National Longitudinal Survey of Youth 79 (NLSY79)

Objectives of the Study

The main objectives of this quantitative analysis are the following:

The first objective is to determine whether there is a relationship between religious attendance and physical and mental health and depression among those who turned age 40 and over in the year 2000 from the national data set of the National Longitudinal Study of Youth 1979 (NLSY79), controlling for key sociodemographic variables of gender, race/ethnicity, marital status, education, number of children in the household, work amount, net family income, region, and residence. Although the relationship between religious participation and physical health, mental health and depression has been studied previously, as discussed in the preceding chapters, most of these prior studies have used localized study samples, while few studies have examined national data.

The second objective is to determine whether religious attendance in young adulthood (ages 22-25; measured in the year 1982) has an impact on physical and mental health and depression eighteen years later in mid-adulthood (ages 40-43; measured in the year 2000), controlling for baseline health status in 1981 (health limitations in amount of kind of work one could do for pay measured in 1981) and controlling for sociodemographic variables in 1982 and 1998 (including gender, race/ethnicity,

marital status, education, number of children living in the household, work amount, net family income, region, and residence).

The third and last objective is to test the hypothesized pathway of lifestyle/behavior examining the specific mediators of (1) alcohol abuse and dependency; (2) frequency of heavy drinking; and (3) frequency of cigarette smoking, in an attempt to explain and better understand the possible mechanisms by which religious attendance may affect physical health, mental health and depression. The theory is that religious attendance may indirectly affect health through influencing lifestyle and behavior choices. Lifestyle and behaviors may then directly influence health outcomes.

The Key Findings of the Three Objectives

The major findings for Objective I of the cross-sectional relationship between religious participation and physical health, mental health, and depression for the year 2000 are described as follows. A curvilinear U-shaped relationship between attendance levels and physical health: Moderate-to-infrequent attendance (one to three times per month to several times a year or less) was associated with better physical health among middle-aged individuals ($p=0.09$), controlling for sociodemographic factors such as race, gender, marital status, number of children, income, work amount, residence, and region. Additionally, individuals of low socioeconomic status reported better physical health outcomes for some attendance compared with no attendance ($p=0.00$). African Americans reported better mental health ($p=0.02$) and lower depression ($p=0.00$) scores with higher attendance levels compared with no attendance. The opposite trend occurred for Caucasians and others.

The key finding of Objective II was that early attendance in young adulthood in 1982 was positively associated with better mental health ($p=0.02$) and less depression

($p=0.05$) in middle adulthood in 2000, controlling for sociodemographic factors such as race, gender, marital status in 1982, number of children living in the household in 1982, net family income in 1981, work amount in 1981, residence in 1982, and region in 1982. Similar results were obtained for 1982 religious attendance effects on better mental health in 2000 ($p=0.04$), controlling for sociodemographic variables of race, gender, marital status in 1982 and 1998, education in 1982, number of children living in the household in 1982 and 1998, work amount in 1982 and 1998, net family income in 1982 and 1998, residence in 1982 and 1998, and region in 1982.

The main findings of Objective III are that frequency of cigarette smoking (1994) was a mediator between the relationship of religious attendance in 1982 and the outcome variables of depression and mental health in 2000. Alcohol abuse or dependency in 1994, and frequency of heavy drinking in 1994 showed evidence of mild mediation for depression, controlling for race, gender, marital status in 1982, number of children in 1982, net family income in 1982, work amount in 1981, and residence and region in 1982. For example, religious attendance in 1982 decreased in significance in the presence of the significant mediators of cigarette smoking in 1994 (from $p = 0.05$ to $p = 0.26$), and mildly decreased in significance in the presence of the mediators of alcohol abuse or dependency in 1994 (from $p = 0.05$ to $p = 0.11$), and heavy drinking in 1994 ($p = 0.05$ to $p = 0.07$), for the dependent variable of depression 2000.

In addition, respondents with higher attendance levels as young adults were less likely to engage in risky behaviors of alcohol abuse or dependency, heavy drinking, and smoking more than a decade later, controlling for race, gender, marital status in 1982, number of children in 1982, net family income in 1981, work amount in 1981, and residence and region in 1982. For example, young adults in 1982 who attended more

than once per week had a 71 to 73 percent lower odds of abusing or being dependent on alcohol in 1994 (OR = 0.29 [0.16, 0.53] 95% CI) or of drinking heavily in 1994 (OR = 0.27 [0.14, 0.50] 95% CI). They also had a 75 percent lower odds of heavy cigarette smoking in 1994 (OR=0.24 [0.11, 0.50] 95% CI).

Overview of Chapter

This chapter provides a description of the methods and three main objectives of this quantitative study. The chapter is organized as follows. First, I provide a description of background information on the study dataset, the National Longitudinal Youth Survey 79, (NLSY79), and the sub-cohort selected for this study's analysis, 2,102 respondents aged 40 and over who participated in the health module of the NLSY79 in 2000. Next, I describe the three objectives, the accompanying research question, and the methodology for each objective.

A more complete description of the objectives is provided following the description of the sample, later in the chapter.

Background on National Longitudinal Survey of Youth Study

This quantitative study is based on a secondary data analysis of the National Longitudinal Survey of Youth 1979 (NLSY79). The survey has followed a cohort of American youth and adults, representative of the population, over time from 1979 through the present, observing life course events to assess changes in career, education, family, and other social factors. The NLSY79 is a replication of an analysis based on the original cohorts of young women and men begun in the mid-1960s, which focused on school-to-work transitions and education and labor changes. The NLSY79 survey originally focused on labor force and education experiences administered by the Bureau of Labor Statistics, an agency of the U.S. Department of

Labor. The Center for Human Resource Research (CHRR) at The Ohio State University manages the NLSY79. Other government agencies have funded special sets of questions. For example, health questions have been added and funded by the U.S. Department of Health and Human Services; alcohol and substance use questions have been added and funded by the National Institute on Alcohol Abuse and Alcoholism (Center for Human Resource Research [CHRR], 2004).

In the initial year of the cohort, 1979, the subjects were aged 14 to 21 years, with an original sample size of 12,686. By 2000, the respondents were in their mid- to late 30s to early 40s, with a total sample size of 8,033 (CHRR, 2004). The sample has been interviewed in person every year from 1979 to 1994, and every two years from 1996 to the present. This overall NLSY79 survey provides details on the experiences of a large group of young adults who are representative of all American women and men born in the late 1950s and early 1960s (CHRR, 2004). The cohort was selected with an over-representation of minorities and economically disadvantaged Caucasians, as well as youth in the military.

The retention rate of the overall sample was 80.6 percent in 2000 (not including those purposely dropped from the sample). The average number of interviews completed per respondent was 17.4 out of 19 interviews administered over the twenty-year period of the study. The overall racial composition of the NLSY79 has remained fairly constant over time: Hispanic, 19.7% (1979) to 19.1% (2000); African American, 30.1% (1979) to 30.3% (2000); and Caucasians and all other racial/ethnic groups, 50.2% (1979) to 50.6% (2000) (CHRR, 2004).

Selection of this Study Sample from the Health Module 2000

This particular study is limited to those who responded to the health module in the 2000 survey, with a sample size of 2,102. These individuals ranged from 40 to 43 years of age in 2000, as they were 19 to 22 years old in the initial survey year of 1979. A health module with a series of health and physical exercise questions was added to the survey beginning in 1998 (CHRR, 2004). The series of questions in the health module are administered only once to each respondent, in the survey year in which the respondent turns age 40 and over.

There are four sections in the health module (CHRR, 2004). The first part asks respondents about the Center for Epidemiological Studies Depression Scale (CES-D).

The second part inquires about when the respondent last visited a healthcare professional, when the respondent last had a physical exam, and whether hereditary health problems are present based on information about parental health status.

The third section inquires about the respondent's perceived physical and mental health (regardless of formal health service use) through a twelve-item questionnaire.

The fourth section inquires about major diagnoses. The health module was added to the survey to obtain more detailed health information on the aging cohort as its members near retirement age, and chronic health problems of the cohort which may affect their ability to work (CHRR, 2004). Prior to completion of the health module, the only health information collected concerned possible health restrictions in the amount or kind of work a respondent could do for pay (affecting six percent of the overall sample of 12,686). A serious malady that slowly develops over time will not

be found from these questions until the respondent actually drops out of the labor market (CHRR, 2004). Information on health restrictions is used as baseline health information during the year 1981, for Objective II, examining the influence of religious attendance in 1982 on later health in 2000.

Overall Sample Design and Screening of the NLSY79

The sample of the NLSY79 was selected through a process of short screening interviews. Those screened for interviews were taken from randomly selected households from sample segments of Primary Sampling Units (PSUs), which included most of the fifty states and the District of Columbia, obtained through the National Opinion Research Center (NORC) Master Probability Sample of the United States. The NORC also obtained a random sample of Department of Defense internal records so that the sample could include military personnel (CHRR, 2004). There were 18,000 screening interviews among the 918 sample segments in 102 PSUs for the civilian cross-sectional sample. A supplemental sample was conducted consisting of 57,000 screening interviews, among 900 sample segments, in a 100-PSU sample, specifically designed to produce statistically efficient samples of Hispanics, African Americans, and economically disadvantaged Caucasians and others (CHRR, 2004). There was no screening interview conducted for the military sample; persons on active military duty as of September 30, 1978, were sampled from Department of Defense rosters (CHRR, 2004).

The respondents interviewed in 1979 were from 8,770 separate households, of which 2,862 provided more than one respondent. A total of 5,908 respondents came from individual households. A total of 5,863 respondents came from the same household in which multiple siblings were interviewed, and 330 respondents were members of households in which their spouses were also interviewed (CHRR, 2004). The NLSY79

does not contain nationally representative samples of siblings and spouses of all ages and living arrangements (CHRR, 2004).

The screening interviews conducted with each randomly selected household collected basic information for over 155,000 individuals such as the name, age, race, sex and address of each household member. From this information, all individuals aged 14 to 21 years of age as of December 31, 1979, were identified and assigned to one of three sample groups described below. In 1979, the individuals were asked to participate in the first NLSY79 interview. Those who completed the first interview were considered part of the NLSY79 cohort, for a total of 12,686 individuals at an 87 percent overall participation rate.

The three independent probability samples were designed to represent the entire population of youth aged 14 to 21 residing in the United States as of January 1, 1979. The three samples are as follows:

(1) A cross-sectional sample designed to represent (noninstitutionalized) young people living in the U.S., and born in 1957 through 1964, aged 14 to 21 as of December 31, 1978 (6,111 individuals, representing a 90% participation rate among those selected; CHRR, 2004).

(2) A set of supplemental samples designed to over-sample civilian Hispanic, African American and economically disadvantaged non-Hispanic, non-African American youth living in the U.S. and born between 1957 and 1964, aged 14 to 21 as of December 31, 1978 (5,295 individuals, representing an 89% participation rate among those randomly selected to participate; CHRR, 2004).

(3) A military sample designed to represent those serving in the military as of Fall 1978, and born between 1957 and 1961, aged 17 through 21 as of December 31, 1978 (1,280 individuals, representing a 72% participation rate among those selected for interviews; CHRR, 2004).

Stratification of Overall Sample of the NLSY79

The samples were collected in multi-stage, stratified random samples rather than by simple random samples. The sample was stratified according to the following: (a) general population of youth in 1979 (approximately 6,000); (b) over-representation of minorities (approximately 5,000); and (c) military youth sample collected (approximately 2,000). The multi-stage, stratified random samples tend to create geographic clusters. These geographic clusters create clusters of individuals that tend to be similar with regard to certain characteristics, such as cultural or economic characteristics. Such clustering effects have decreased over the time of the longitudinal survey, however, because respondents have become more mobile, distributing themselves more uniformly throughout the country, compared with their original locations in 1979.

Interview of Overall Sample of the NLSY79

In-person interviews were conducted for each individual in the cohort every year from 1979 until 1994 (except in 1987 because of budget issues, when a limited phone interview was performed in place of a personal interview) and every two years from 1994 to the present. In the initial years of the survey, the interviews were conducted during the first half of the year and, in all other years of the survey, interviews were conducted in the latter half of the year. The interview lasts approximately one hour in person and 40 minutes by telephone. The majority of interviews were conducted in person. However, some individuals were interviewed by phone, by request or because

of moving over time, or because of the difficulty of transporting the interviewer to the home, especially in rural or oversea areas (ranging from 4.4% telephone interviews in 1979 to 32.5% telephone interviews in 2000; NLSY79 User's Guide, 2000). From 1979 until 1989, the interviews were conducted using only paper and pencil, with the interviewer filling in information in questionnaire booklets, which were later transcribed. By 1993, all interviews were conducted as laptop computer-assisted personal interviews, with the interviewer entering the responses of the respondent directly onto the laptop. The computer eliminated the need for transcription and was found to reduce recording error (and to be highly reliable and valid). The respondents were paid a small sum upon completion of the interview (\$10 from 1979 to 1995 and \$20 beginning in 1996; CHRR, 2004).

Change in Overall Sample through Time and Retention Rates

The military sample was intentionally reduced from 11,280 to 201 in 1985. The sub-cohort of economically disadvantaged Caucasians and others (non-Hispanic, non-African American) was dropped from the study in 1991 (a total of 1,643 members; CHRR, 2004).

A concerted effort was made to keep track of participants' locations over time and to achieve a high rate of retention of study participants. The NORC was able to continue conducting interviews with about 33 to 50 percent of respondents who initially refused, resulting in a relatively high retention rate for longitudinal panel data over the twenty-year time span. The retention rate was nearly 90 percent in 1979 and was 80.6 percent in 2000 (not including those purposely dropped from the sample; CHRR, 2004).

Potential Sources of Selection Bias

There are possible sources of selection bias in the study. Selection bias may occur from fluctuations in religious attendance over time. Or, selection bias may occur because religious individuals may have some unobserved factor that contributes to their health compared with nonreligious individuals. In order to deal with these possible selection issues, a new variable was created to account for change in religious attendance over time from 1982 to 2000, described in further detail in the chapter covering Objective II. The dependent health variables, SF-12 physical and mental health composite scores (PCS and MCS), and the Center for Epidemiological Study-Depression (CES-D) score, are asked of each respondent one time only, when a respondent turns 40 or over beginning in 1998, when the health module was added to the survey.

As just mentioned, since the health questions are available at only one point in time for each individual, the year the respondent first turns age 40 or over after 1998, a change in health status over time cannot be adequately observed. However, a baseline measure of 1981 health was used in the analysis, specifically reflecting whether the respondent feels that health could limit the amount or kind of work he or she could do for pay. This baseline health variable attempts to account for the health status of the individual before religious attendance is measured in 1982. The new independent variable measuring change in religious attendance from 1982 to 2000, and the baseline health 1981 variable, are included in a general linear model for the second objective (including other potential confounding and interacting variables to be controlled for).

Another potential form of selection bias may occur: Perhaps religious people are more apt to participate in the study compared with the nonreligious because of a sense of

civic duty, for example, or likewise are less likely to participate because of issues concerning privacy or personal religious belief. These potential sources of selection bias are not controlled for in the study.

Weights

Weights allow the results of the analysis to be generalizable to the U.S. population of which the NLSY79 data is representative. The 2000 sample weight was used for the descriptive statistics, as shown in Chapter Four. The 2000 sample weight accounts for the oversampling of minorities, specifically African Americans and Hispanics, and individuals lost to follow-up after 1979 to the present. The 2000 sample weight also accounts for the oversampling, then later dropping, of the economically disadvantaged Non-Hispanic and non-African Americans, and military. However, approximately 200 military were kept in the study. The design effect of clustering is not accounted for in the descriptive statistics using the sample weight of 2000. However, this should only affect the precision of the summary statistics such as the standard errors of the mean health scores of the dependent variables and the precision of the regression coefficients, but not the counts or percentages of the independent variables in the descriptive statistics (CHRR, 2004; J. Zagorsky, personal communication, Spring 2005). Without taking into account the design effect of clustering, the reported standard errors are narrower or more precise than they really are (CHRR, 2004; J. Zagorsky, personal communication, Spring 2005).

All regression analysis results in this study are reported from unweighted data; thus the reported analyses can not be generalizable to the U.S. population, only to the sample population used in the analysis. In order to eliminate the impact of oversampling, dummy variables for the three racial/ethnic groups were used (J. Zagorsky, personal communication, Spring 2005). Accounting for the design effect of

clustering minimally changes the results of the analyses, particularly the precision of the coefficients (J. Zagorsky, personal communication, Spring 2005). For example, a sample weight of 1979 was added to one of the regression analyses to account for the over-sampling of minorities, and the results were very similar to those of models without the weights.

Power

Power is another potential limitation in analyzing the relationship between religious attendance and health in the NLSY79 cohort. The sample size for this study is limited to those who completed the health module in 2000, a sub-cohort of 2,102 individuals, from among the 8,033 individuals in the study in the year 2000. The decrease in respondents from 12,686 in 1979 to 8,033 in 2000 is due to either intentional or unintentional drop-out or loss to follow-up interviews. Although the retention rate is relatively high for those not purposely dropped from the study, for some questions, not all of the individuals respond. The survey is extensive, with separate modules for specific sub-cohorts. The health variables measuring the physical and mental health composite scores of the SF-12 survey are found in the health module only. This health module is administered only to respondents who first turn age forty or over at the time of the interview, beginning in 1998, and in subsequent survey years. For this study, the independent health variables were selected from the year 2000, as the religious attendance variable is available for the year 2000 as well. The dependent health variable on depression, the Center for Epidemiological Study-Depression scale (CES-D), is added in 1992. In the year 2000, for the age 40-and-over sub-cohort, 2,102 individuals responded to both the SF-12 health survey and the CES-D depression scale. Power may become an issue as the sample size further decreases when stratifying the data among various sub-cohorts by gender, ethnicity, education, work amount, income, and conducting subsequent regression models on the relationship

between the independent variable of religious attendance and the dependent variable of health.

The problem of missing variables was particularly indicated for the income variable. A new category of missing income was created within the net family income variable, so those respondents who were missing income were still included in the analysis.

The assumptions of regression were tested, particularly tests for normality (normal distribution of the residuals), and equal variance.

Multicollinearity

Tests between variables were performed to test for multicollinearity between independent variables. Correlation matrixes were also created to help determine correlations between independent variables. The measurements used for the independent measure of health (SF-12 PCS, SF-12 MCS, CES-Depression Scores) have been selected from instruments that have been previously tested for validity and reliability.

Statistical Software

The main statistical program used for this study's analysis was SPSS, Version 13.

Objective I.

Cross-Sectional Analysis of the Relationship between Religious Attendance and Physical and Mental Health and Depression in the Year 2000, Among Those Aged 40 and Over.

The first objective is to determine whether there is a relationship between religious attendance and physical and mental health and depression in the year 2000, for the

sub-cohort of those aged 40 and over in 2000, controlling for socio-demographic variables.

Methods for Objective I:

Observation of a cross-sectional analysis obtained by running a general linear model to examine the relationship between religious attendance in 2000 and physical and mental health and depression in 2000.

General Linear Model for Objective I: Physical or Mental Composite Score (PCS or MCS), or C-ESD score^a = $\beta_0 + \beta_1$ (Religious attendance 2000)^{*b} + β_2 (Socio-demographic variables 2000)^{*c} + β_3 (Interacting variables of religious attendance with sociodemographic variables)^{*d} + ... ϵ

*denotes categorical variables (i.e. indicator variables)

Dependent Health Variables:

^a *Physical and Mental Composite Scores (MCS):* The Physical and Mental Component Scores (PCS and MCS) are composite scores from the SF-12 items, measuring self-perceived overall general health, for the 40-and-over age group (2000). The CES-D Depression scale measures symptoms of depression and discriminates between clinically depressed individuals and others.

Independent Variables:

^b *Religious attendance and affiliation* questions were asked of respondents in the years 1979, 1982, and 2000, described previously in the methods section.

^c *Socio-demographic Variables:* These variables include gender, race, marital status, education level, number of children (biological, adopted or step) living in the same

household as the respondent, amount of work (measured as hours per week worked in past calendar year from the survey year), net family income (measured in the past calendar year from the survey year), residence (urban or rural), and region of the United States where the respondent lives.

^d*Interacting Variables:* Two-way interactions of religious attendance with each sociodemographic variable were tested (and in some models three-way interactions were also tested).

Details of Descriptions of Dependent and Independent Variables Used in the Analysis

Dependent Variables: Outcomes of Physical Health, Mental Health and Depression

As previously reported, the sample selected for this study (sample size 2,102) is based on those individuals who responded to questions in the health module in 2000, and includes those who turned 40 and over in the year 2000.

The dependent variables measured in this study's three objectives are physical and mental health and depression. These dependent health variables are described below.

SF-12 Mental Composite Score (MCS), SF-12 Physical Composite Score (MCS):

The independent physical and mental health variable scores are based on the SF-12, a 12-item scale on self-reported general health used in the health module of the NLSY79. The SF-12 survey is a 12-question health survey designed to measure the respondents' mental and physical health status and outcomes from the patients' points of view, regardless of their inclination to use formal health services (CHRR, 2004). It was developed as a shorter and more valid version of the SF-36 (a 36-item instrument), for use in large surveys and longitudinal studies of health outcomes. The

SF-12 and SF-36 instruments were designed by John Ware of the New England Medical Center Hospital. The SF-12 survey has high reliability and validity. It has been translated and adapted for use in thirty-six countries.

The SF-12 includes one or two items from each of the eight health concepts, relevant across age, disease and treatment groups. These eight health concepts include (1) limitations on physical health, (2) limitations on physical activities, (3) limitations on social activities and the usual role in activities, (4) emotional problems, (5) measures of vitality (energy and fatigue), (6) mental health (psychological distress and well being), (7) bodily pain, and (8) general health perceptions (Medical Outcomes Trust, 2001).

The scale was administered to respondents who had turned age 40 since their last interview as part of the age-40-and-over health module, included in the 1998 and 2000 surveys. The health module was added to capture health information on the aging of the cohort and health problems which may lead to disabilities in the future, affecting employment.

A summary score for each mental and physical health component was created from each of the SF-12 mental and physical health questions. The scores were summed according to a formula created by the SF-12 originators, Ware et al. (NLSY79 Codebook Supplement). Each of the twelve questions is used and weighted differently for the physical health composite score (PCS) and the mental health composite score (MCS) (M. DeRosa, personal communication, Spring 2005).

The descriptives section in the following chapter, reporting the results for Objective I, compares this study's sample PCS and MCS scores to the norm scores for the U.S. population, holding age constant, and to the norm scores for U.S. residents aged 35 to 44.

Center for Epidemiological Studies Depression Scale (CES-D):

For those 40 years of age and older, a depression scale (Center for Epidemiological Studies Depression Scale, CES-D) was administered in 1992 (full scale of 20 items), and in 1994, 1998, and 2000 (a reduced set of 7 items). This scale measures symptoms of depression, distinguishing between clinically depressed individuals and others. The CES-D scale is highly correlated with other depression rating scales (CHRR, 2004). The shorter version of the CES-D scale measures how the respondent felt during the past week with respect to the following seven items: (1) poor appetite, (2) trouble keeping mind on tasks, (3) depressed feelings, (4) extra effort, (5) restless sleep, (6) sadness, and (7) not being able to get going.

Independent Variables:

Religious Attendance

In gathering information on a respondent's background characteristics, questions about the respondent's religious attendance and affiliation were included in the survey years 1979, 1982 and 2000 (CHRR, 2004). The religious attendance variable used in the survey was sorted into six categories of attendance: (1) more than once per week, (2) about once per week, (3) about three times per month, (4) about once per month, (5) infrequent or several times per year or less, and (6) not at all. Due to low frequency, categories (3) and (4) were collapsed into a single category, "about one to three times per month," totaling five overall categories used in this study's analysis.

This is described in the following chapter in the descriptives section, for Objective I results.

A change in the religious attendance variable is created to account for changes in attendance from 1982 to 2000. The variable was created based on differences in religious attendance levels from 1982 to 2000. This variable is further described in a later chapter, in the results section for Objective II.

Religious Affiliation

Religious affiliation was inquired of respondents in the years 1979, 1982 and 2000. The main religious affiliations a respondent could choose to identify with were (1) Protestant, and (1b) various Protestant denominations; (2) Roman Catholic; (3) Jewish; (4) Other; and (5) No religion. Non-Judeo-Christian religions were not inquired of, and were considered as part of the “Other” category. Those of Non-Judeo-Christian faiths represent a marginal proportion of the cohort; this may be due to the lower representation of people of those faiths who were living in the U.S. as young adults in 1979, when the study was initiated (S. McClaskie, personal communication, Spring 2005).

Other Religious Variables

There were other religious variables available but not used in this study analysis, mainly due to low numbers, because they refer only to those who are married or with children. In 1982 and 2000, respondents answered questions concerning their new spouses’ current religious affiliations, the religions in which the spouses were raised, and attendance at religious services (CHRR, 2004). This provides information about religious affiliation for both partners in the same year. Respondents were asked how often they argued about religious matters with their spouses in 1988, 1992, 1994,

1996, 1998 and 2000. Among many questions pertaining to the amount of time fathers spent in activities with their oldest and/or youngest biological children, there was a question asking male respondents how much time they spent in religious activities with their oldest and youngest children (for the years 1998 and 2000).

Sociodemographic Control Variables

Sociodemographic control variables were used in all models for Objectives I, II, and III. These variables were controlled for because they are widely known to contribute to variability in dependent health variables. They include gender, race/ethnicity, marital status, education level, number of children (biological, adopted or step) living in the same household as the respondent, amount of work (measured as hours per week worked in the past calendar year from the survey year), net family income (in the past calendar year from the survey year), residence (urban or rural), and region of the United States in which the respondent lives. Net family income, a variable created by the NLSY79 based on 19 variables within the dataset, refers to the total income of the household, contributed by all members of the household living with the respondent (CHRR, 2004; S. McClaskie, personal communication, 2005).

Objective II

The Influence of Early Adulthood Religious Attendance in 1982 on Physical and Mental Health and Depression in Mid-Adulthood in 2000

The purpose of Objective II is to examine the influence of religious attendance in 1982 (during young adulthood, aged 22 to 25) on physical and mental health and depression in 2000 (middle adulthood, aged 40 to 43), controlling for the sociodemographic variables of gender, race/ethnicity, marital status, education, number of children living in the household, amount of work, income, residence, and region. Change in religious

attendance from 1982 to 2000 and religious affiliation in 1982 were controlled for, as well as the indirect measure of baseline health in 1981.

Question for Objective II:

Does religious attendance in early adulthood, in 1982, influence mid-adulthood physical and mental health or depression, in 2000 (for respondents aged 40 and over in 2000), controlling for 1982 socio-demographic variables and baseline health in 1981?

Methods for Objective II:

A general linear model was used to examine the relationship between religious attendance in 1982 (or a change in religious attendance from 1982 to 2000) to later physical and mental health and depression in 2000, controlling for socio-demographic variables.

General Linear Model for Objective II:

Physical and Mental Composite Score (PCS, MCS) and C-ESD score 2000^a = $\beta_0 + \beta_1$ (Religious attendance 1982 or Change in attendance from 1982 to 2000)^{b e} + β_2 (Socio-demographic variables 1982)^{c f} + β_3 (Interacting variables 1982)^{d g} + β_4 (baseline health limitations 1981) ^h + ε

*denotes categorical variables (i.e. indicator variables)

Independent Variable: change over time

^e A new variable was created to measure the difference in attendance levels between 1982 and 2000 for each respondent. This new variable is based on seven categories, described in further detail in a later chapter reporting Objective II results.

^fThe 1982 socio-demographic variables are controlled for in the model, in a manner similar to the way in which 2000 variables were controlled for as described in Objective I. The sociodemographic variables include the following gender, race/ethnicity, marital status, education level, number of children (biological, adopted or step) living in the same household as the respondent, amount of work (measured as hours per week worked in the past calendar year from the survey year), net family income (in the past calendar year from the survey year), residence (urban or rural), and region of the United States in which the respondent lives.

^gPotential interacting variables of religious attendance in 1982 with other socio-demographic variables in 1982.

^hBaseline health is measured using the proxy and crude measure of health limitations in 1981, as there were very few health variables in the model until the health module was added in 1998. This variable was posed in the survey question pertaining to whether health could limit the amount or kind of work a respondent could do for pay in 1981. Controlling for baseline health is an attempt to control for the possibility of reverse causality.

Objective II dependent mental and physical health and depression variables are identical to those described previously under Objective I, but the independent variables for Objective II (including religious attendance, affiliation, and sociodemographic control variables) are from the year 1982 rather than the year 2000. Also, 1998 sociodemographic controls were added to some of the models in Objective II.

Objective III

Test for Mediation of the Relationship between Early Adulthood Religious Attendance (1982) on later Health Status (2000) by Cigarette Smoking and Alcohol Dependency

If the association between religious attendance and health in Objective I is positive, then possible mediating pathways to help explain the association are tested.

Pathway and Mediator Effects:

If an association is found between religious attendance and health, the question as to “why” is explored. “Mediators explain how external physical events take on internal psychological significance” (Baron & Kenny, 1986). In an attempt to explain the relationship between religious attendance and health, the possible pathway of lifestyle and behavior through the specific mediator variables of alcohol dependency and frequency of cigarette smoking are explored in Objective III. Mediation is tested by examining the relationship between the independent religious attendance variable and the dependent health variables. There are three steps needed to test mediation. The first two steps involve (1) the relationship between the independent variable (religious attendance) and the mediator variable (alcohol dependency, cigarette smoking frequency); and (2) the relationship between the mediator and dependent variable (physical and mental health or depression; Barron & Kenny, 1986). If the potential mediator variable acts as a mediator between the predictor variable of religious attendance and the dependent health variable (physical and mental health or depression), the first two steps of the correlations, described above, should be significant. The relation between the predictor variable (religious attendance) and the dependent variable (physical and mental health or depression) should be reduced after controlling for the relation between the mediator and the dependent variable (Baron &

Kenny, 1986). These steps are described in greater detail below in the presentation of Objective III.

Mediation Criteria

To determine the explanatory relationship between religious attendance and physical and mental health and depression, tests for mediation were performed. One of the theoretical pathways to help explain the relationship between religious and spiritual practices is lifestyle and behavior (refer to Figure 3.1 and Figure 3.2). The theory is that religious practice influences lifestyle and behaviors. The lifestyle or behavior then influences health. In order to determine whether a lifestyle or behavior is a mediator for the association between religious attendance and health, tests for mediation were performed. There are three criteria to test for mediation, as described below.

(1) The independent variable (religious attendance 1982) must be significantly associated with the dependent variable (physical and mental health or depression 2000), controlling for other sociodemographic variables (1982).

(2) The independent variable (religious attendance 1982) must be significantly associated with the mediator variable (alcohol dependency 1994 or frequency of cigarette smoking 1994).

(3) The association of the independent variable (religious attendance 1982) with the dependent variable (physical health, mental health or depression 2000), must decrease in significance in the presence of the mediator variable (alcohol abuse or dependency 1994 or frequency of cigarette smoking 1994), controlling for other sociodemographic variables (1982).

The behavior and lifestyle factors available in the dataset are related to alcohol use and cigarette smoking. The year 1994 was chosen for the smoking and alcohol variables, as it falls within the twenty-year time period of the religious attendance variable in 1982 and the physical and mental health and depression variables in 2000.

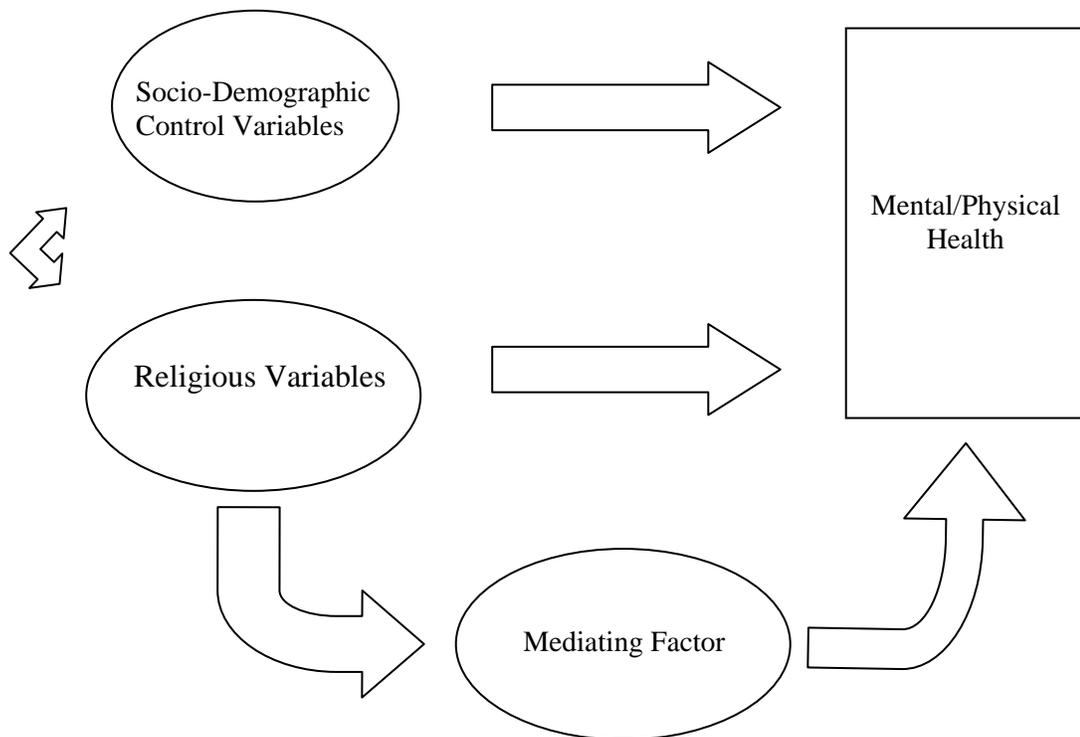


Figure 3.1 Model of Mediating Pathway to Help Explain the Relationship of Religiousness on Mental and Physical Health Outcomes.

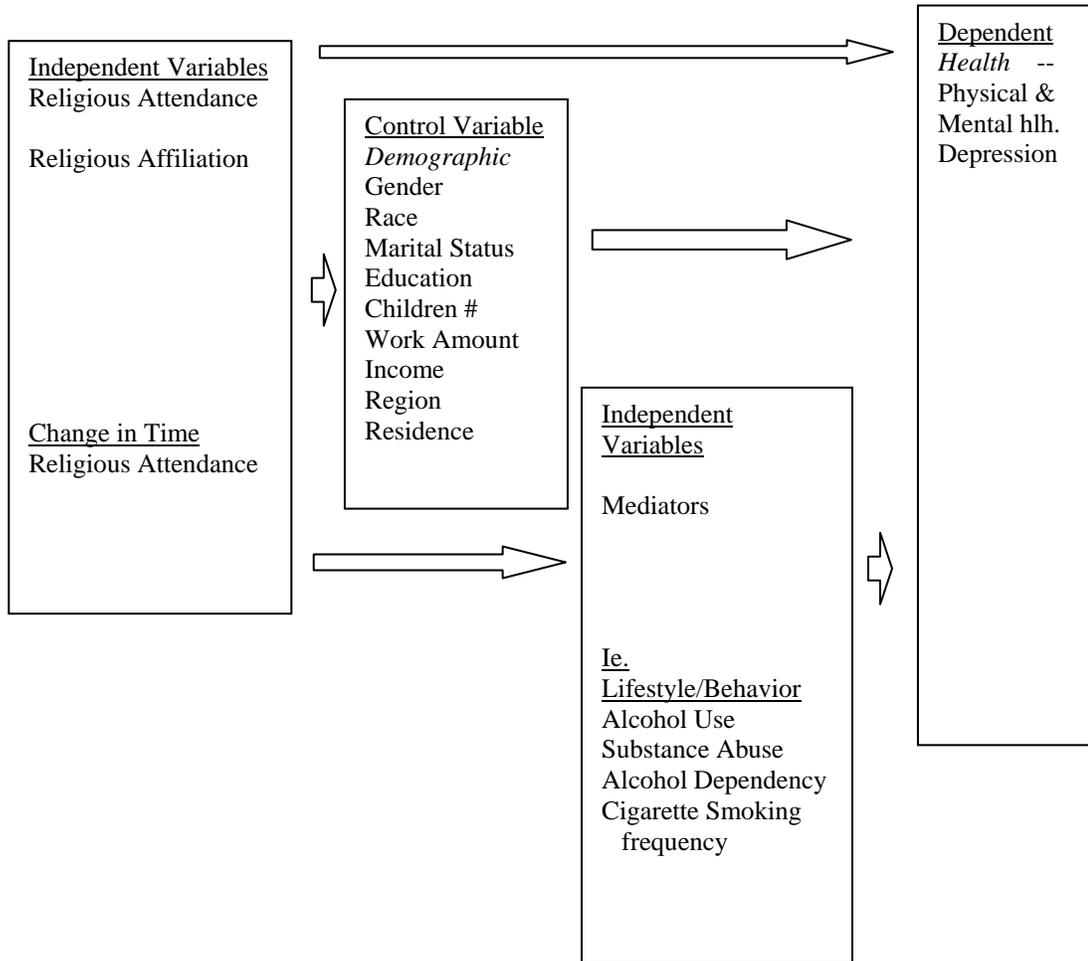


Figure 3.2 Model of Religiousness Effect on Physical Health, Mental Health and Depression.

Question for Objective III.

Does the pathway of lifestyle/behavior measured with respect to the mediators of alcohol abuse or dependency 1994, heavy alcohol drinking frequency in 1994, or frequency of cigarette smoking 1994 explain the relationship between religious attendance 1982 and physical health, mental health or depression in the year 2000, for the sub-cohort aged 40 and over (controlling for other sociodemographic variables)?

Methods for Objective III:

Create a general linear model to examine the mediation of alcohol abuse or dependency, heavy alcohol drinking frequency and cigarette smoking frequency within the relationship between religious attendance 1982 and later physical health, mental health, and depression in 2000, controlling for socio-demographic variables. Refer to the three steps for mediation described above.

Model for Objective III: General Linear Model

Physical and Mental Composite Score (PCS, MCS) and CES-Depression Score 2000^a
 $= \beta_0 + \beta_1 (\text{Religious attendance 1982})^* \beta^b + \beta_2 (\text{Socio-demographic variables 1982})^{*c}$
 $+ \beta_4 (\text{Mediator of Alcohol Dependency 1994 or Cigarette Smoking Frequency 1994})^* \beta^i + \beta_5 (\text{Baseline Health 1981})^{*j} \dots + \epsilon$

*denotes categorical variables (i.e. indicator variables)

ⁱ Mediating Factors:

Potential mediating factors are variables that measure lifestyle/behaviors, such as alcohol abuse or dependency, heavy alcohol drinking frequency, and cigarette smoking frequency.

^j *Baseline Health Limitations*

Defined as limitations in the amount or kind of work a respondent could do for pay because of health in 1981. This variable is included in an attempt to control for the possibility of reverse causality.

Description of Potential Mediator Variables

The behavior and lifestyle factors available in the dataset are related to alcohol use and cigarette smoking. The year 1994 was chosen for the smoking and alcohol variables, as this year falls within the twenty-year time period of the religious attendance variable in 1982 and health variables in 2000. The following paragraphs describe how the alcohol abuse or dependency variable, heavy alcohol drinking frequency and cigarette smoking frequency variables were created.

Alcohol questions were included periodically in the survey, during the years 1982, 1985, 1988, 1989, 1992, 1994 and 2002. Alcohol-related questions pertained to (1) quantity and frequency; (2) abuse or dependency symptoms, consisting of two separate sections; (2a) physiological and behavioral symptoms and (2b) lifestyle symptoms (impact on school, work, relationships); and (3) family history of alcohol abuse and dependency (for 1988 only; CHRR, 2004). Many of the questions were adapted from the National Health Interview Surveys of the U.S. Census Bureau (CHRR, 2004).

This study focuses on the alcohol abuse-dependency symptoms, a section of questions pertaining to physiological and behavioral symptoms and lifestyle symptoms from the survey year 1994. The questions asked are listed below. The Likert scale for each response was:

- (1) Happened 3 or more times in the past year
- (2) Happened 2 times in the past year
- (3) Happened 1 time in the past year
- (4) Happened during lifetime other than in the past year
- (5) Never Happened

Alcohol abuse-dependency symptoms, focusing on physiological/behavioral symptoms and lifestyle symptoms:

- (1) Got into a fight
- (2) Did things while drinking that caused others to be hurt
- (3) Tried to cut down or quit but failed
- (4) Spent a lot of time drinking/getting over drinking
- (5) Sick/vomited after drinking
- (6) Difficult to stop once started
- (7) Sweat/shake after drinking
- (8) Drank more than intended to
- (9) So hung over that it interfered with things supposed to do
- (10) Heard/saw things not there
- (11) Found same amount of alcohol had less effect
- (12) Found had to drink more than once did to get same effect
- (13) Continued drinking even though threat to health
- (14) Continued drinking even though caused emotional problems
- (15) Felt depressed, irritable, nervous after drinking or the morning after

Alcohol abuse-dependency symptoms, focusing on lifestyle symptoms (impact on School, Work, Relationships):

- (1) Kept drinking even though caused problems with work, home, school
- (2) Stayed away from work because of hangover
- (3) Drinking led to quitting job
- (4) Drinking hurt chances for promotion
- (5) Significant other left/threatened to leave
- (6) Arrested/trouble with police after drinking
- (7) Drink to keep from shaking after drinking/morning-after drinking
- (8) Lost ties with/drifted apart from family members
- (9) Gave up/cut down activities/interests
- (10) Drove a car after drinking too much

A categorical variable functioning as an “alcohol abuse or dependency” indicator was created based on responses to the series of twenty-five questions listed above. If a respondent experienced one or more symptoms of abuse or dependency one or more times within the last year the respondent was put in the category of “alcohol abuse or dependency” (T.C. Harford, personal communication, Summer 2005). The other two possible category options within this variable were that the respondent did not experience any symptoms of alcohol abuse or dependency within the last year, or did not drink in the last month or since the last interview.

There is no established practice for measuring the series of alcohol abuse or dependency questions used in the NLSY79 survey (T.C. Harford, personal communication, Summer 2005). The alcohol dependency and abuse questions in the

NLSY79 may be used to define DSM-IV diagnostic estimates for alcohol abuse and dependence (T. C. Harford, personal communication, Summer 2005). However, those criteria are more stringent than the criteria used in this study.

The other alcohol variable tested as a possible mediator in this study that may indicate an alcohol problem was frequency of heavy drinking, measured as having six or more drinks on one occasion during the last month.

The cigarette smoking variable, tested as a possible mediator in this study was “number of cigarettes smoked per day.” The variable in the survey was continuous. For this study, the variable was converted into a categorical variable, with three values: (1) 20 or more cigarettes smoked per day; (2) 19 or fewer cigarettes smoked per day; (3) nonsmoker. The third value for nonsmoker was defined as one of the following: 0 cigarettes smoked per day, smoking fewer than 100 cigarettes in a lifetime, never smoking daily, or smoking occasionally or not at all.

CHAPTER 4 Objective I Results

This chapter presents the results of the analysis of Objective I, as described in Chapter 3. Objective I is designed to provide a cross-sectional analysis of the relationship between religious participation and physical and mental health and depression in 2000 among a subcohort aged 40 to 43 years within the NLSY79 dataset.

The chapter is organized as follows. First, I describe sample characteristics. Next, I review the results of several multiple regression models. The results pertaining to the association of religious attendance with physical health are described first, followed by the outcomes pertaining to mental health and depression.

Demographics of the Sample Population

Primary Control Variables

The sample population ($n = 2102$) for this analysis was limited to those who turned 40 and over in 2000 (ages 40-43) and had completed a health module of the NLSY79 survey by 2000. This health module was administered beginning in 1998, and was administered only once for each participant, when each first turned 40 years of age or over at the time the follow-up questionnaire was administered.

The unweighted socio-demographic characteristics of the study sample are listed in Table 4.1. There were slightly more females (51.7%) than males. The racial groups consisted of Caucasians and others who were not African American or Hispanic (50.7%), African Americans (30.5%), and Hispanics (18.8). Most were married (58.7%), with some high school education (51.3%) or some college or graduate school (45.4%). Only 3.3 percent had less than a high school education. Almost half had two

or more children (47.3%; biological, adopted, or step) living in the household. Most respondents had worked 20 hours or more per week (81.6%) in the past year (1999), and about 40 percent fell into an income range of from \$20,600 to almost \$70,000. About 20 percent earned more than \$70,000, and about 20 percent earned less than \$20,600. Almost 20 percent of the respondents did not answer the income question (18.8%). These individuals with missing income information were sorted into a “missing” category within the income variable, so as not to be lost from the study.

Key Independent Variable: Religious Attendance

Frequency of religious attendance among this sample aged 40 to 43 shows that almost half attend some form of religious observance once or more per week (47.4%).

Approximately 20 percent of the respondents attended religious services more than once a week in 2000 (20.7%), 26.7 percent attended once per week, 23.2 percent attended one to three times per month, 19 percent attended infrequently (several times a year or less), and only 10.5 percent reported not attending religious services at all (refer to Table 4.1). Interestingly, in this particular study sample, males attended religious services more frequently than females by a difference of about ten percent. For attendance at religious services once per week or more, 52.7% of males attended, compared with 42.2% females attended. It is unclear why males reported attending religious services more frequently than females.

Weighted Descriptive Demographics Characteristics

The weighted sociodemographic characteristics of the sample are shown in Table 4.2 and Table 4.3. The sample weight used is for the year 2000. This weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. In addition, the sample weight for the year 2000 adjusts for over-sampling

of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped, while 200 remained in the sample (S. McClaskie, personal communication, Spring 2005). In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. As mentioned in the methods section in Chapter 3, a limitation of this sample weight 2000 is that it does not account for the design effect of clustering. This limitation does not affect the frequencies and percentages. It affects only the standard error, reporting the standard error to be more precise than it actually is (J. Zagorsky, Ohio State University, personal communication, Spring 2005; National Longitudinal Surveys [NLS], 2004).

For Table 4.2, the 2000 sample weight is divided by the mean sample weight to obtain the original sample size of approximately 2102 in order to directly compare the frequency of each variable with the unweighted descriptive statistics reported in Table 4.2. For Table 4.3, the 2000 sample weight is used in order to obtain the actual frequencies of the noninstitutionalized U.S. population born between 1957 and 1964 living in the U.S. in 1978, who turned 40 and over in the year 2000. The total number of people this corresponds to is about 9.3 million (refer to Table 4.3). The percentages are exactly the same using the two variations of the sample weight for the calendar year 2000 as shown in Table 4.3 and Table 4.4; only the frequencies differ. Comparing the percentages of the unweighted to the weighted descriptive statistics (Table 4.1 compared with Table 4.2 and Table 4.3), the main difference is among the variable of race/ethnicity. The weighted descriptive statistics compared to the unweighted descriptive statistics actually report 12 percent fewer Hispanics, 16.6 percent fewer African Americans, and 28.6 percent more Caucasians and others. This difference is

attributable to the oversampling of minorities in the study sample. The other descriptive characteristic that differs between the weighted and unweighted tables is income. The weighted net family income reported in 1999 is actually higher by about five percentage points for the categories of the top 25 percent and lowest 25 percent income levels compared with the unweighted income levels (refer to Table 4.1, Table 4.2 and Table 4.3). All the other reported descriptive characteristic percentages are similar, within a few percentage points of difference for the weighted versus unweighted descriptive statistics. Interestingly, the percentage of males is slightly higher, by 3.1 percent, for the weighted descriptive statistics than for the unweighted descriptive statistics. The weighted descriptive statistics report slightly more males (51.4%) than females (48.6%) (by 2.8 %) compared with the unweighted descriptive statistics, which report 3.4 percent more females (51.7%) than males (48.3%) (refer to Table 4.1, Table 4.2 and Table 4.3).

The weighted descriptive statistics for religious attendance levels are slightly higher for frequent attendance of once per week or more, and lower for less frequent attendance of one to three times per month to not at all, compared with the unweighted descriptive statistics for attendance. However the differences are slight within two percentage points (refer to Table 4.1, Table 4.2 and Table 4.3).

Table 4.1 Demographic Characteristics by Religious Attendance 2000 Unweighted.

Independent Variables 2000		Religious Attendance 2000										Row Variable Total	
		>1/wk		About 1/wk		About 1-3/ mth		<=Sev./yr (In-frequent)		Not at all			
		#	Row %	#	Row %	#	Row %	#	Row %	#	Row %			#	Col. %
Gender	Female	191	17.6	270	24.9	260	24.0	220	20.3	144	13.3	1085	51.7
	Male	244	24.1	290	28.6	226	22.3	178	17.6	76	7.5	1014	48.3
Race/Ethnicity	Hispanic	70	17.8	113	28.7	86	21.8	89	22.6	36	9.1	394	18.8
	African American	92	14.4	161	25.2	183	28.6	115	18.0	89	13.9	640	30.5
	Caucasian and Others	273	25.6	286	26.9	217	20.4	194	18.2	95	8.9	1065	50.7
Marital 2000	Widowed/Separated	35	24.8	39	27.7	31	22.0	18	12.8	18	12.8	141	6.7
	Divorced	87	27.0	86	26.7	84	26.1	45	14.0	20	6.2	322	15.3
	Married	204	16.6	315	25.6	289	23.5	276	22.4	147	11.9	1231	58.7
	Never married	109	27.0	120	29.7	82	20.3	59	14.6	34	8.4	404	19.3
Education 2000	College/Grad School	153	16.1	237	24.9	223	23.4	222	23.3	117	12.3	952	45.4
	High School	267	24.8	305	28.3	248	23.0	162	15.0	95	8.8	1077	51.3
	None/Grammar	15	21.4	18	25.7	15	21.4	14	20.0	8	11.4	70	3.3
Child Number 2000	>=2 Children	135	13.6	247	24.9	256	25.8	231	23.3	123	12.4	992	47.3
	1 Child	80	20.4	100	25.5	104	26.5	65	16.6	43	11.0	392	18.7
	0 Children	220	30.8	213	29.8	126	17.6	102	14.3	54	7.6	715	34.1
Work Amt 1999	Full-Time (FT) > 20 hrs/wk	337	19.8	463	27.2	408	23.9	321	18.8	175	10.3	1704	81.6
	Part-Time (PT) 0 to 20 hrs/wk	95	24.8	95	24.8	71	18.5	77	20.1	45	11.7	383	18.4
Income Net Family 1999	Missing	81	20.6	103	26.1	88	22.3	80	20.3	42	10.7	394	18.8
	Top 25% (>=\$70,000)	66	15.1	125	28.6	103	23.6	105	24.0	38	8.7	437	20.8
	Mid 50% (\$ >=20,600 >= 69800)	172	20.5	220	26.2	200	23.8	156	18.5	93	11.1	841	40.1
	Lowest 25% (<=\$20,516)	116	27.2	112	26.2	95	22.2	57	13.3	47	11.0	427	20.3
Religious Attendance Total		435	20.7	560	26.7	486	23.2	398	19.0	220	10.5	2099	100

Note: These independent variables were significantly related to the dependent outcome variables of physical health, mental health and depression in the regression models examining the relationship of religious attendance to physical health, mental health and depression, controlling for these sociodemographic variables listed in this table (refer to Table 4.10).

Table 4.2 Demographic Characteristics by Religious Attendance 2000 Weighted (2000 sample weight divided by mean sample weight to obtain original sample size of approximately 2102 in order to directly compare frequency and percentage of each variable with the unweighted descriptive statistics).

Independent Variables 2000		Religious Attendance 2000										Row Variable Total	
		>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all		#	Col N %
		#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %		
Gender	Female	220	21.6	255	25.0	225	22.0	200	19.6	121	11.8	1021	48.6
	Male	280	26.0	312	29.0	234	21.7	177	16.4	75	6.9	1078	51.4
Race/Ethnicity	Hispanic	26	18.1	42	29.7	32	22.4	29	20.4	13	9.4	142	6.8
	African American	45	15.5	74	25.4	84	28.8	50	17.3	38	13.0	291	13.9
	Caucasians and all others	430	25.8	451	27.1	343	20.6	297	17.9	144	8.7	1665	79.3
Marital status	widowed/separated	36	38.1	22	23.0	14	14.9	12	12.8	11	11.2	95	4.6
	Divorced	91	29.1	87	27.6	76	24.3	41	13.0	19	6.1	314	15.0
	Married	272	19.8	360	26.2	317	23.1	284	20.7	141	10.2	1373	65.5
	Never married	101	32.1	99	31.6	51	16.3	40	12.7	23	7.3	314	15.0
Education	College/Grad School	189	18.4	269	26.1	237	23.0	225	21.8	110	10.7	1030	49.1
	High School	296	29.0	288	28.2	213	20.9	145	14.1	80	7.9	1023	48.7
	None/Grammar	15	32.2	10	22.7	8	18.0	7	15.4	5	11.8	45	2.2
Child #	>= 2 Children	163	16.1	245	24.3	255	25.2	233	23.0	115	11.4	1010	48.1
	1 Child	91	23.6	106	27.3	100	25.9	59	15.3	30	7.9	387	18.4
	0 Children	247	35.1	217	30.9	104	14.8	85	12.1	50	7.2	702	33.4
Work Amt 1999	> 20 hrs/wk	401	23.1	480	27.6	398	22.9	303	17.4	157	9.0	1740	83.5
	0 to 20 hrs/wk	96	28.0	84	24.4	52	15.0	73	21.3	39	11.3	344	16.5
Income Net Family 1999	Missing	89	25.2	88	24.8	64	18.1	73	20.6	40	11.2	353	16.8
	Top 25% (>=\$70,000)	86	15.7	151	27.7	135	24.8	133	24.4	40	7.4	546	26.0
	Mid 50% (\$ >=20,600 >= 69800)	207	24.1	235	27.3	195	22.7	137	15.9	87	10.1	862	41.1
	Lowest 25% (<=\$20,516)	118	34.9	94	27.8	64	18.9	34	9.9	28	8.4	338	16.1
Religious Attendance Total		500	23.8	568	27.0	459	21.9	377	17.9	196	9.3	2099	100.0

Note: The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample (S. McClaskie, personal communication, Fall 2005). In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The 2000 sample weight is divided by the mean sample weight to obtain the original sample size of approximately 2102 in order to directly compare the frequency and the percentage of each variable with the unweighted descriptive statistics.

Table 4.3 Demographic Characteristics by Religious Attendance 2000 Weighted (2000 sample weight used to obtain descriptive statistics of the noninstitutionalized U.S. population living in the U.S. in 1978 who were born between 1957 and 1964 and turned 40 and over in the year 2000).

Independent Variables 2000		Religious Attendance 2000											
		>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all		Total	
		#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Col-umn N %
Gender	Female	976873	21.6	1132058	25.0	997452	22.0	885876	19.6	535550	11.8	4527809	48.6
	Male	1242930	26.0	1386197	29.0	1037249	21.7	784793	16.4	332062	6.9	4783231	51.4
Race/Ethnicity	Hispanic	113888	18.1	187353	29.7	141473	22.4	128283	20.4	59386	9.4	630383	6.8
	African American	200261	15.5	328826	25.4	372686	28.8	223256	17.3	168031	13.0	1293059	13.9
	Caucasians and others	1905654	25.8	2002077	27.1	1520542	20.6	1319131	17.9	640195	8.7	7387598	79.3
Marital	widowed/separated	161155	38.1	97531	23.0	63240	14.9	54295	12.8	47286	11.2	423508	4.6
	Divorced	404994	29.1	384045	27.6	338615	24.3	180634	13.0	84518	6.1	1392807	15.0
	Married	1206384	19.8	1596098	26.2	1405971	23.1	1259388	20.7	623664	10.2	6091505	65.5
	Never married	447269	32.1	440582	31.6	226874	16.3	176352	12.7	100984	7.3	1392061	15.0
Education	College/Grad School	840121	18.4	1194142	26.1	1051531	23.0	997408	21.8	487058	10.7	4570260	49.1
	High School	1314771	29.0	1278352	28.2	946852	20.9	642225	14.1	356765	7.9	4538965	48.7
	None/Grammar	64911	32.2	45762	22.7	36317	18.0	31036	15.4	23789	11.8	201814	2.2
Child #	>= 2 Children	721585	16.1	1088043	24.3	1129514	25.2	1031889	23.0	509250	11.4	4480281	48.1
	1 Child	404495	23.6	468688	27.3	445360	25.9	262792	15.3	134931	7.9	1716266	18.4
	0 Children	1093723	35.1	961525	30.9	459827	14.8	375988	12.1	223430	7.2	3114492	33.4
Work Amt 1999	> 20 hrs/wk	1780544	23.1	2129732	27.6	1767789	22.9	1345699	17.4	695200	9.0	7718964	83.5
	0 to 20 hrs/wk	427937	28.0	372932	24.4	229973	15.0	324970	21.3	172411	11.3	1528223	16.5

Table 4.3 (Continued).

Independent Variables 2000	Religious Attendance 2000											
	>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all		Total	
	#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Col-umn N %
Net Family Income Missing 1999	395362	25.2	388195	24.8	283767	18.1	323304	20.6	175918	11.2	1566546	16.8
Top 25% (>=\$70,000)	380449	15.7	670065	27.7	600825	24.8	592119	24.4	178684	7.4	2422142	26.0
Mid 50% (\$ >=20,600 >= 69800)	920280	24.1	1043351	27.3	866397	22.7	606115	15.9	387182	10.1	3823325	41.1
Lowest 25% (<=\$20,516)	523712	34.9	416645	27.8	283711	18.9	149132	9.9	125827	8.4	1499026	16.1
Religious Attendance 2000 Total	2219803	23.8	2518255	27.0	2034701	21.9	1670669	17.9	867611	9.3	9311040	100.0

Note: The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

Other Religious Variables

Religious Affiliation

For the study sample using unweighted descriptive statistics reported in Table 4.4, more than half reported Protestant affiliation in the calendar year 2000 (approximately 60%). The most common Protestant denomination was Baptist (26.7%). Catholics accounted for slightly less than 30 percent of the population, and Jews one percent. Slightly more than ten percent (10.4%) reported no religious affiliation. The highest attendance rate across all affiliations was “about once per week” to “one to three times per month” (except for those of the denomination “other”; these individuals reported attending “not at all” most frequently [32.3%]).

Paradoxically, those who reported “no religion” affiliation reported the highest attendance rate at the level of most frequent attendance, “more than once per week” (70.5%). This apparent anomaly in the descriptive statistics was verified with the NLSY data source center. The archivist of the dataset rechecked the original source of the data, and verified that this is what the original data reports (S. McClaskie, personal communication, Spring 2005). This apparent contradiction in the descriptive statistics may be a source of data collection error and thus misclassification bias. However, a more likely explanation for the discrepancy may be the wording of the questions, and/or skip patterns within the survey instrument for this particular year 2000 (Jay Zagorsky, Center for Human Resource Research, Ohio State University, personal communication, Fall 2005). This anomaly of the data is not consistent with the previous year 1982 when religious affiliation and attendance questions were included in the survey. Those who reported no religious affiliation in 1982 most commonly reported attending religious services at the level of “not at all” (68.3%) and reported

attending religious services “more than once per week” at less than one percent (0.9%; as shown in Table 5.7, in Chapter 5).

Other Sociodemographic Control Variables

Almost 40 percent of the respondents reported in the calendar year 2000 living in the Southern region of the United States (39.7%), while only 16.2 percent reported living in the Northeast, about one quarter (24%) reported living in the North Central region, and about one fifth (20.1%) reported living in the West. Most reported living in urban areas (73.1%). In terms of occupation, respondents reported approximately a one-third equal distribution across “white collar” (31.4%), blue collar (27.2%), and “service/clerical/sales” (29.3%). Less than one percent reported household (0.9%) or farmer or armed forces (0.7%) as their occupation. Only 13.0 percent were considered to be in “poverty status” (refer to Table 4.4).

For each of the sociodemographic control variables including the significant and nonsignificant unweighted variables listed in Table 4.1 and Table 4.4, the highest frequency of attendance most commonly reported was once per week. Exceptions occurred for those who reported the highest frequency of attendance at “more than once per week,” which were the divorced (27.0%), those at the lowest 25 percent income level (27.2%), and those with no religion affiliation (70.5%). Those who most commonly reported moderate attendance of “one to three times per month” were African Americans (28.6%), those with children (52.3%), those living in the South (25.8%), and those having a religious affiliation of either Baptist (29.5%) or Episcopalian/Presbyterian (36.1%; refer to Table 4.1 and Table 4.4).

Other Weighted Sociodemographic Characteristics

Other sociodemographic control variables weighted with the 2000 sample weight are listed in Table 4.5 and Table 4.6 (using the same sample weights used for the tables in Table 4.2 and Table 4.3, respectively). As previously mentioned, this sample weight for the year 2000 accounts mainly for oversampling of minorities and attrition from 1979 to 2000. The sample weight also accounts for the oversampling of economically disadvantaged Caucasians and military, most of which were dropped from the study later. As previously mentioned, the percentages are exactly the same using the two variations of the sample weight for the calendar year 2000, as shown in Table 4.5 and Table 4.6; only the frequencies differ. Comparing the percentages of the unweighted to the weighted descriptive statistics (Table 4.4 compared with Table 4.5 and Table 4.6), there are some differences of about 5 percent, for religious affiliation, region, residence, and poverty status. The weighted descriptive statistics compared with the unweighted descriptive statistics actually report 6.5 percent fewer Baptists and 3.5 percent more Lutherans and Methodists, about 4 percent fewer individuals living each in the South and North Central regions of the U.S., almost 6 percent more individuals living in a rural residence and almost 6 percent fewer living in an urban residence, and last, slightly more than 5 percent not living in poverty, and about 3 percent fewer living in poverty (refer to Table 4.4 compared with Table 4.5 and Table 4.6). All the other reported descriptive characteristic percentages are similar, within a few percentage points of difference for the weighted versus unweighted descriptive statistics.

Table 4.4 Other Demographic Characteristics by Religious Attendance in 2000 Unweighted.

Independent Variables 2000		Religious Attendance 2000											
		>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all		Total	
		#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Col. N %
Religious Affiliation	Protestant/Christian/NonDenomCh/UnknDenom	49	16.6	67	22.7	61	20.7	61	20.7	57	19.3	295	14.1
	Baptist	84	15.0	142	25.4	165	29.5	111	19.8	58	10.4	560	26.7
	Episcopalian/Presbyterian	2	3.3	18	29.5	22	36.1	17	27.9	2	3.3	61	2.9
	Lutheran/Methodist	30	15.1	63	31.7	54	27.1	39	19.6	13	6.5	199	9.5
	Catholic	92	15.6	182	31.0	146	24.8	135	23.0	33	5.6	588	28.1
	Jewish	0	0.0	14	66.7	4	19.0	1	4.8	2	9.5	21	1.0
	Other (Specify)	23	14.8	22	14.2	27	17.4	33	21.3	50	32.3	155	7.4
	None, No Religion	153	70.5	52	24.0	7	3.2	0	.0	5	2.3	217	10.4
Region	West	111	26.6	123	29.5	77	18.5	68	16.3	38	9.1	417	20.1
	South	134	16.2	188	22.8	213	25.8	170	20.6	120	14.5	825	39.7
	North Central	105	21.1	131	26.3	113	22.7	108	21.7	41	8.2	498	24.0
	Northeast	78	23.2	112	33.3	77	22.9	51	15.2	18	5.4	336	16.2

Table 4.4 (Continued).

Independent Variables 2000		Religious Attendance 2000										Total	
		>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all			
		#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %		
Residence	Unknown	11	27.5	7	17.5	10	25.0	7	17.5	5	12.5	40	1.9
	Rural	103	20.0	134	26.0	112	21.7	109	21.2	57	11.1	515	24.9
	Urban	314	20.8	410	27.1	353	23.3	280	18.5	155	10.3	1512	73.1
Occupation	Missing	44	20.0	63	28.6	52	23.6	36	16.4	25	11.4	220	10.5
	Household	4	21.1	8	42.1	5	26.3	0	.0	2	10.5	19	0.9
	Blue Collar	115	20.2	147	25.8	130	22.8	112	19.6	66	11.6	570	27.2
	Farmer/Armed Forces	1	7.1	4	28.6	4	28.6	4	28.6	1	7.1	14	0.7
	Service/Clerical/Sales	121	19.7	171	27.9	137	22.3	126	20.5	59	9.6	614	29.3
	White Collar	149	22.6	167	25.3	157	23.8	119	18.1	67	10.2	659	31.4
Poverty Status	Missing	81	20.6	103	26.1	88	22.3	80	20.3	42	10.7	394	18.8
	Poverty	66	24.3	73	26.8	60	22.1	42	15.4	31	11.4	272	13.0
	Not in Poverty	288	20.1	384	26.8	338	23.6	276	19.3	147	10.3	1433	68.3
Religious Attendance Total		435	20.7	560	26.7	486	23.2	398	19.0	220	10.5	2099	100.0

Note: These independent variables were not significantly related to the dependent outcome variables of physical health, mental health or depression in the regression models examining the relationship of religious attendance to physical health, mental health and depression, controlling for these sociodemographic variables listed in this table.

Table 4.5 Other Demographic Characteristics by Religious Attendance in 2000 Weighted (2000 sample weight divided by mean sample weight to obtain original sample size of approximately 2102 in order to directly compare frequency and percentage of each variable with the unweighted descriptive statistics).

Independent Variables 2000		Religious Attendance 2000											
		>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all		Total	
		#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Col. N %
Religious Affiliation	Protestant/Christian/NonDenomCh/UnknDenom	59	19.3	79	25.8	58	18.9	65	21.0	46	15.0	307	14.7
	Baptist	78	18.5	104	24.7	117	27.7	77	18.2	46	11.0	423	20.2
	Episcopalian/Presbyterian	4	4.2	26	29.6	32	35.5	26	28.9	2	1.8	89	4.2
	Lutheran/Methodist	40	15.1	87	33.0	71	27.0	49	18.8	16	6.1	263	12.5
	Catholic	99	17.3	168	29.6	141	24.8	128	22.6	32	5.6	568	27.1
	Jewish	0	0.0	20	65.4	6	18.7	1	3.3	4	12.6	30	1.4
	Other (Specify)	29	18.2	25	15.8	30	19.1	29	18.4	45	28.5	158	7.6
	None, No Religion	189	73.8	58	22.8	4	1.5	0	.0	5	1.8	256	12.2
Region	West	125	33.3	107	28.5	67	18.0	42	11.2	34	9.0	374	18.0
	South	156	20.9	169	22.8	170	22.9	150	20.1	99	13.3	745	35.8
	North Central	132	22.2	151	25.5	133	22.5	130	21.9	47	7.9	592	28.5
	Northeast	81	21.9	136	36.9	84	22.9	53	14.5	14	3.8	369	17.7
Residence	Unknown	11	30.0	7	20.0	7	19.1	7	20.1	4	10.8	36	1.7
	Rural	141	22.1	168	26.4	124	19.5	134	21.1	69	10.9	636	30.7
	Urban	343	24.5	385	27.5	320	22.9	232	16.6	120	8.6	1400	67.6

Table 4.5 (Continued).

Independent Variables 2000		Religious Attendance 2000											
		>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all		Total	
		#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Col. N %
Occupation	Missing	54	23.8	67	29.8	52	22.8	36	15.9	18	7.8	227	10.8
	Household	7	33.7	7	32.5	5	23.3	0	.0	2	10.6	21	1.0
	Blue Collar	133	23.5	149	26.3	118	20.7	102	17.9	65	11.5	567	27.1
	Farmer/Armed Forces	3	16.9	4	23.3	4	23.2	4	28.0	1	8.6	15	0.7
	Service/Clerical/Sales	145	24.1	168	27.9	131	21.8	113	18.8	45	7.4	602	28.7
	White Collar	157	23.7	172	26.0	148	22.3	121	18.3	65	9.7	663	31.7
Poverty Status	Missing	89	25.2	88	24.8	64	18.1	73	20.6	40	11.2	353	16.8
	Poverty	68	33.7	55	26.9	37	18.3	24	11.8	19	9.3	203	9.7
	Not in Poverty	343	22.2	426	27.6	358	23.2	280	18.1	137	8.9	1543	73.5
Religious Attendance Total		500	23.8	568	27.0	459	21.9	377	17.9	196	9.3	2099	100.0

Note: The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

Table 4.6 Demographic Characteristics by Religious Attendance in 2000 Weighted (2000 sample weight used to obtain descriptive statistics from the study sample which was designed to be representative of those age 40 and over in 2000 among the noninstitutionalized U.S. population born between 1957 and 1964).

Independent Sociodemographic Control Variables 2000		Religious Attendance 2000											
		>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all		Total	
		#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	N %
Religious Affiliation	Protestant/Christian/NonDenom./UnknDenom	263714	19.3	351339	25.8	258196	18.9	286433	21.0	204196	15.0	1363878	14.7
	Baptist	347083	18.5	463226	24.7	519444	27.7	341633	18.2	206283	11.0	1877669	20.2
	Episcopalian/Presbyterian	16629	4.2	117052	29.6	140200	35.5	114005	28.9	6954	1.8	394841	4.2
	Lutheran/Methodist	176245	15.1	384463	33.0	314040	27.0	219260	18.8	70813	6.1	1164822	12.5
	Catholic	437089	17.3	745777	29.6	626022	24.8	570077	22.6	141852	5.6	2520816	27.1
	Jewish	0	.0	86675	65.4	24757	18.7	4323	3.3	16728	12.6	132482	1.4
	Other (Specify)	127965	18.2	110937	15.8	134442	19.1	129474	18.4	200014	28.5	702832	7.6
	None, No Religion	838333	73.8	258787	22.8	17600	1.5	0	.0	20772	1.8	1135491	12.2
Region	West	553809	33.3	472686	28.5	299324	18.0	186490	11.2	149002	9.0	1661310	18.0
	South	691679	20.9	751933	22.8	756207	22.9	665392	20.1	438163	13.3	3303373	35.8
	North Central	584252	22.2	670133	25.5	589843	22.5	575430	21.9	207692	7.9	2627350	28.5
	Northeast	358349	21.9	604299	36.9	374479	22.9	236468	14.5	62136	3.8	1635731	17.7
Residence	Unknown	47930	30.0	31981	20.0	30514	19.1	32151	20.1	17192	10.8	159768	1.7
	Rural	623904	22.1	745125	26.4	550123	19.5	595203	21.1	308040	10.9	2822395	30.7
	Urban	1520693	24.5	1708529	27.5	1420668	22.9	1029230	16.6	531760	8.6	6210880	67.6

Table 4.6 (Continued).

Independent Sociodemographic Control Variables 2000		Religious Attendance 2000											
		>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all		Total	
		#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	Row N %	#	N %
Occupation	Missing	239126	23.8	299226	29.8	229201	22.8	159561	15.9	78404	7.8	1005518	10.8
	Household	31659	33.7	30536	32.5	21896	23.3	0	.0	9978	10.6	94069	1.0
	Blue Collar	591651	23.5	662525	26.3	521315	20.7	451065	17.9	289435	11.5	2515991	27.1
	Farmer/ Armed Forces	11432	16.9	15772	23.3	15677	23.2	18967	28.0	5816	8.6	67663	0.7
	Service/ Clerical/ Sales	641901	24.1	745599	27.9	582434	21.8	501341	18.8	197494	7.4	2668770	28.7
	White Collar	697556	23.7	764597	26.0	654902	22.3	538508	18.3	286484	9.7	2942048	31.7
Poverty Status	Missing	395362	25.2	388195	24.8	283767	18.1	323304	20.6	175918	11.2	1566546	16.8
	Poverty	303114	33.7	242107	26.9	164350	18.3	106259	11.8	83903	9.3	899733	9.7
	Not in Poverty	1521327	22.2	1887954	27.6	1586584	23.2	1241106	18.1	607790	8.9	6844761	73.5
Religious Attendance 2000 Total		2219803	23.8	2518255	27.0	2034701	21.9	1670669	17.9	867611	9.3	9311040	100

Note: The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

Dependent Variables: Health Outcome

SF-12 Physical Composite Score (PCS), Mental Composite Score (MCS) and Center for Epidemiological Study-Depression Score (CES-D)

The dependent variables examined in this study were physical and mental health outcomes (refer to Table 4.7, Table 4.8 and Table 4.9). The physical health score was based on the SF-12 12-item scale on self-reported general health. Each of the 12 items was weighted differently to obtain an overall measure of a physical health composite score (PCS) and a separate overall measure of a mental health composite score (MCS).

For the unweighted data, the mean reported physical health score (SF-12 PCS) for the 2000 calendar year sample aged 40 to 43 was 51.92, which is above the national mean (holding age constant) of 50, and above the national mean (for ages 35-44) of 52.2 (refer to Table 4.7). The mean reported mental health score (SF-12 MCS) for the sample was 52.80, above the national mean (holding age constant) of 50 and above the national mean for the age group 35-44 of 50.1 (refer to Table 4.7). For MCS, a score of 42 or lower indicates depression (M. DeRosa, SF-36 Research Center, personal communication, Spring 2005). Another mental health variable for depression used in the study was the Center for Epidemiological Study Depression (CES-D) score. This score is based on 7 items, scaled 0-3, with a possible score range of 0-21. The cut-off point as an indicator for depression for these 7 items is a score of 6 or greater (J. Zagorsky, the Ohio State University, personal communication, Spring 2005) The mean CES-Depression score for this study sample was 3.5, which is below the threshold of the depression cut-off point of 6 (refer to Table 4.7).

The summary statistics using the sample weight for the calendar year 2000 showed slightly better physical health, mental health and depressions scores than the

unweighted data (refer to Table 4.7). However, the reported standard error and deviation for the weighted summary statistics were more precise than they actually should be because the design effect of clustering was not accounted for with the sample weight for the calendar year 2000. Therefore, it is unclear if the reported weighted health scores were actually slightly better compared with the unweighted health scores.

The unweighted highest mean PCS and MCS scores and the lowest depression score (indicating better health) were reported for those who attend religious services “several times per year or less” (52.7 [PCS], 53.2 [MCS], 3.0 [CES-D]; refer to Table 4.8). Those who reported the lowest physical health score and highest depression score (indicating poorer health) were the most frequent attenders, at “more than once per week” (50.7 [PCS], 4.0 [CES-D]). Those who reported the lowest mean mental health score (indicating poorer health) were those who attended “about once per week” (52.4 [MCS]; refer to Table 4.8).

For the weighted data as shown in Table 4.9, using the sample weight for the calendar year 2000, the best physical health, mental health, and depression scores occurred for those who attended infrequently in the year 2000. The worst physical health, mental health, and depression scores occurred for those who attended the most frequently, more than once a week (refer to Table 4.9). Note, however, that the standard errors were more precise than they should be because the design effect of clustering was not taken into account in the sample weight for the calendar year 2000.

Table 4.7 Summary Statistics for NLSY79 SF-12 Physical Health Composite (SF-12 PCS), Mental Health Composite Score (SF-12 MCS), and CES-Depression (CES-D) Scores (40 and over age group) (without controls) Unweighted and Weighted (with sample wt. 2000^a).

Health Variable	NLSY79 2000 (ages 40-43) Unweighted			NLSY79 2000 (ages 40-43) Weighted (2000 sample wt)*				US population (ages 35-44)		US population (age held constant)	
	Mean (μ)	SD	SE	N	Mean (μ)	SD	SE	Mean (μ)	SD	Mean (μ)	SD
SF-12 PCS Score ^b	51.92	8.32	0.18	9289680	52.47	7.87	.26	52.2	7.3	50.0	10.0
SF-12 MCS Score ^c	52.80	8.74	0.19	9289680	52.99	8.36	.27	50.1	8.6	50.0	10.0
CES-Depression Score ^d	3.50	4.44	0.10	9302718	3.17	4.18	.001				

^a Weight used is 2000 sample weight, which accounts for most over-sampling of African Americans and Hispanics, and attrition from 1979 to 2000. This weight also accounts for the dropped over-samples of military personnel and economically disadvantaged Caucasians. A limitation of this sample weight is that it does not account for the design effect of clustering. This limitation produces a more precise standard error (SE) and standard deviation (SD) for the weighted summary statistics than is actually correct. The SE and SD in the table above are not correct, presenting a more precise estimate than they actually should be (CHRR 2004).

^b Physical Health Composite Score (PCS) is created from a weighted total score based on each of the SF-12 items. The mean score for the U.S. population is 50.

^c Mental Health Composite Score (MCS) is created from weighted total score based on each of the SF-12 items. The cutpoint indicating depression in the U.S. population is ≥ 42 .

^d Center for Epidemiological Study Depression Total Score: Summation of Total score based on 7 items. The cut-off point indicating depression is ≥ 6 (J. Zagorsky, personal communication, Spring 2005).

Table 4.8 Dependent Variable Health (PCS, MCS and CES-Depression) 2000 Mean Scores by Religious Attendance 2000 (without controls) Unweighted.

Dependent Variable 2000	Religious Attendance 2000									
	> 1/wk		About 1/wk		About 1-3/mth		<=Sev./yr (Infrequent)		Not at all	
	Mean (μ)	SE	Mean (μ)	SE	Mean (μ)	SE	Mean (μ)	SE	Mean (μ)	SE
SF-12 PCS Score ^a	50.7	0.5	52.2	0.3	52.5	0.4	52.7	0.4	51.0	0.6
SF-12 MCS Score ^b	52.6	0.4	52.4	0.4	53.1	0.4	53.2	0.4	52.7	0.6
CES-Depression Score ^c	4.0	0.2	3.5	0.2	3.4	0.2	3.0	0.2	3.6	0.3

^a Physical Health Composite Score (PCS) is created from a weighted total score based on each of the SF-12 items. The mean score for the U.S. population is 50.

^b Mental Health Composite Score (MCS) is created from weighted total score based on each of the SF-12 items. The cutpoint indicating depression in the U.S. population is ≥ 42 .

^c Center for Epidemiological Study Depression Total Score: Summation of Total score based on 7 items. The cut-off point indicating depression is ≥ 6 (J. Zagorsky, personal communication, Spring 2005).

Table 4.9 Dependent Variable Health (PCS, MCS and CES-Depression) 2000 Mean Scores by Religious Attendance 2000 (without controls) Weighted (2000 sample weight used).^a

Dependent Variable 2000	Religious Attendance 2000									
	>1/wk		1/wk		1-3/mth		<=Sev./yr		Not at all	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
SF-12, PCS 2000 Score ^b	51.43	.41	52.39	.35	53.15	.33	53.62	.35	51.52	.70
SF-12, MCS 2000 Score ^c	52.29	.41	52.51	.40	53.44	.38	53.83	.39	53.43	.63
CES-Depression Score ^d	3.91	.22	3.31	.19	2.82	.18	2.49	.19	2.99	.34

^a Weight used is 2000 sample weight, which accounts for most over-sampling of African Americans and Hispanics, and attrition from 1979 to 2000. This weight also accounts for the dropped over-samples of military personnel and economically disadvantaged Caucasians. A limitation of this sample weight is that it does not account for the design effect of clustering. This limitation produces a more precise standard error (SE) for the weighted summary statistics than is actually correct. The SE in the table above are not correct, presenting a more precise estimate than it actually should be (CHRR 2004).

^b Physical Health Composite Score (PCS) is created from a weighted total score based on each of the SF-12 items. The mean score for the U.S. population is 50.

^c Mental Health Composite Score (MCS) is created from weighted total score based on each of the SF-12 items. The cutpoint indicating depression in the U.S. population is ≥ 42 .

^d Center for Epidemiological Study Depression Total Score: Summation of Total score based on 7 items. The cut-off point indicating depression is ≥ 6 (J. Zagorsky, personal communication, Spring 2005).

Objective I Results

Objective I.: Religious Attendance Frequency: Results of General Linear Model

Analysis

Results for Objective I.1: Simple Model: Physical Health and Religious Attendance with controls and no interactions

Cross-sectional analysis was performed to investigate the relationship between religious attendance and physical health, measured as an SF-12 Physical Composite Score (PCS). Key sociodemographic variables were controlled for, including gender, race, marital status, education, number of children, work amount, and income (refer to Table 4.1). The variables of religious affiliation, region, residence, occupation, and

poverty status were included as controls in the model but were dropped because they were not found to be significant (refer to Table 4.4).

For the simple model (in the presence of key controls, with no interactions), a U-shaped curve for health was apparent across levels of religious attendance (refer to Table 4.4). The lowest physical health scores occurred at the two extremes of attendance “>1/wk” (mean [μ] score, 48.4), and “not at all” attendance ($\mu = 48.1$), while increasing health scores ranging from 49.2 to 49.5 occurred with more moderate attendance, “about 1/wk,” “1-3/mth,” and infrequent attendance (measured as “less than or equal to several times/year”). At each of the levels of religious attendance, the mean physical health scores were slightly lower than the overall mean for the sample of 51.9 and the U.S. population (ages 35-44) of 52.2.

As indicated in Table 4.10, better physical scores were related to the following sociodemographic characteristics: having two or more children ($B=1.0$ [0.1, 1.9] CI 95%, $p=0.03$), working 20 or more hours per week in the past calendar year of 1999 ($B=6.1$ [5.2, 7.0] CI 95%, $p = 0.00$), and having an income in the range of mid-50 percent ($\geq \$20,600$ to $\leq \$69,800$; $B=2.8$ [1.8, 3.8] CI 95%, $p=0.00$) to top-25 percent ($\geq \$70,000$; $B=3.3$ [2.0, 4.5] CI 95%, $p=0.00$). Hispanics were found to have lower physical health relative to the reference group of Caucasians and others at borderline significance ($B=-0.9$ [-1.9,-0.02] CI 95%, $p = 0.05$).

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

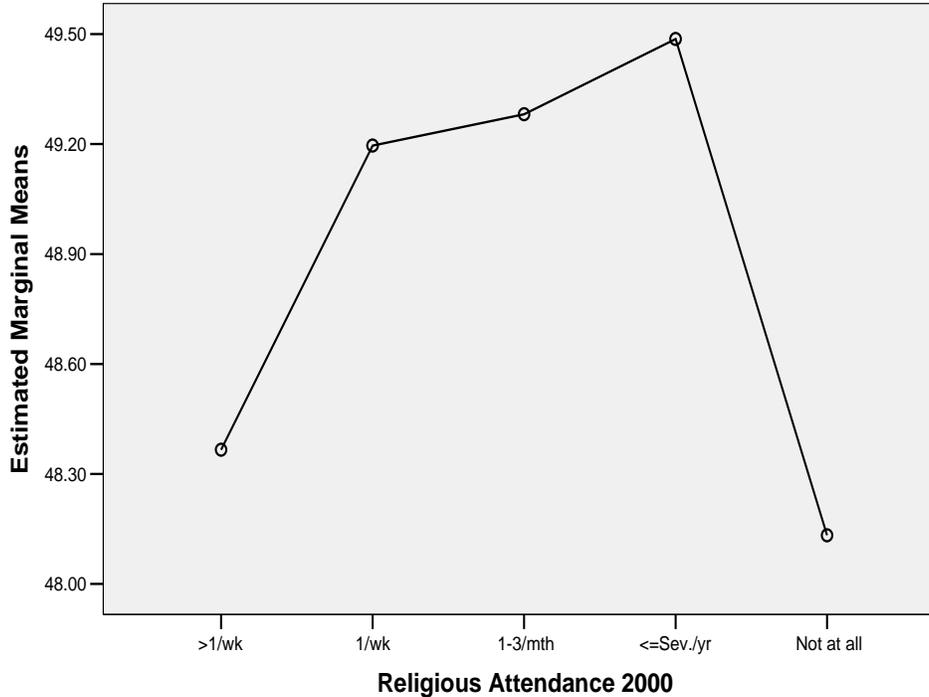


Figure 4.1 Obj. I. Simple Model. Physical Health Composite Score (SF-12 PCS) in 2000 by Religious Attendance in 2000 controlling key sociodemographic variables in 2000 (as listed in Table 4.1: gender, race/ethnicity, marital status, education, children living in the household, work amount in 1999 and net family income in 1999).

In a preliminary analysis, religious affiliation was investigated as an independent variable in relation to the dependent health variables, controlling for key sociodemographic variables listed in Table 4.1. Due to low cell count in some of the religious affiliations, however, the variable was dropped from the model. The preliminary analysis found that religious affiliation was somewhat significantly related to each of the health variables in the simple model. Those who reported affiliation with the Jewish faith had the highest health scores, controlling for sociodemographic variables (listed in Table 4.1).

Table 4.10 Obj. I. Parameter Estimates of Simple Model (no Interactions) for Dependent Variables in 2000 of Physical Health Composite Score (SF-12 PCS), Mental Health Composite Score (SF-12 MCS) and CES-Depression Score (CES-D) by Religious Attendance in 2000 (controlling for sociodemographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999, residence and region).

Independent Control Variables 2000	Physical Health Composite Score (SF-12 PCS 2000)				Mental Health Composite Score (SF-12 MCS 2000)				CESD-Depression Score (CES-D 2000)			
	Parameter	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	43.4	.00	40.9	45.8	48.8	.00	46.0	51.6	5.5	.00	4.1	6.9
Rel. Attend. >1/wk (RA)	.2	.73	-1.1	1.5	.1	.90	-1.3	1.5	.4	.26	-3	1.1
RA 1/wk	1.1	.09	-.2	2.3	-.4	.52	-1.8	.9	.2	.58	-.5	.9
RA 1-3x/mth	1.1	.07	-.1	2.4	.1	.88	-1.3	1.5	-.1	.86	-.7	.6
RA <=Sev.x/yr (Infreq.)	1.4	.04	.1	2.6	.2	.80	-1.2	1.6	-.2	.55	-.9	.5
RA Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-.5	.14	-1.2	.1	-2.0	.00	-2.7	-1.2	.9	.00	.6	1.3
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	-.9	.05	-1.9	-0.02	.4	.42	-.6	1.5	.3	.21	-.2	.9
African American	-.4	.30	-1.3	.4	.2	.61	-.7	1.2	.5	.02	.1	1.0
Caucasian and Others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Widow/Separated	-1.0	.20	-2.5	.5	-1.2	.16	-2.9	.5	.4	.37	-.4	1.2
Divorced	-.7	.24	-1.9	.5	-1.1	.10	-2.4	.2	1.0	.00	.4	1.6
Married	-.1	.86	-1.2	1.0	.0	.99	-1.2	1.2	-.2	.54	-.8	.4
Never Married	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
> High School (HS)	1.5	.13	-.5	3.5	1.0	.39	-1.2	3.2	-.6	.24	-1.7	.4
High School	.5	.60	-1.4	2.4	.3	.82	-1.9	2.4	.1	.90	-1.0	1.1
< High School	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
>=2 Children	1.0	.03	.1	1.9	.4	.45	-.6	1.4	-.1	.59	-.6	.3
1 Child	-.4	.47	-1.4	.7	-.3	.56	-1.5	.8	.2	.40	-.3	.8
No Children	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Amt. in 1999 >20 hrs/wk (FT)	6.1	.00	5.2	7.0	3.6	.00	2.6	4.7	-2.0	.00	-2.5	-1.5
Work Amt. in 1999 0-20 hrs/wk (PT)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income in 1999 Missing	2.1	.00	.9	3.2	.6	.34	-.6	1.9	-1.0	.00	-1.7	-.4
Income in 1999 Top 25%	3.3	.00	2.0	4.5	2.4	.00	1.0	3.8	-2.2	.00	-2.9	-1.5
Income in 1999 Mid 50%	2.8	.00	1.8	3.8	1.4	.01	.3	2.5	-1.8	.00	-2.4	-1.3
Income in 1999 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table 4.10 (Continued).

Independent Control Variables 2000	Physical Health Composite Score (SF-12 PCS 2000)				Mental Health Composite Score (SF-12 MCS 2000)				CESD-Depression Score (CES-D 2000)				
	Parameter	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Residence: Unknown					5.0	.00	2.3	7.7					
Rural					.8	.08	-.1	1.7					
Urban					0(a)	.	.	.					
Region: West									.4	.21	-.2	1.0	
South									.7	.01	.1	1.2	
North Central									.4	.14	-.1	1.0	
Northeast									0(a)	.	.	.	
Adj. R Square	0.153				0.068				0.146				
Corrected Model df	18				20				21				
Error df	2055				2022				2036				
Total df	2074				2043				2058				
F	21.8				8.5				17.7				
Sig.	0.00				0.00				0.00				

Interactions in Models with Outcome Variable of Physical Health Composite Score (PCS): Interaction Models, Attendance with Education, Work, and Income

In order to better understand how key sociodemographic variables influenced the relationship between religious attendance and health, interactions were tested with each key sociodemographic variable and religious attendance listed in Table A.1 and Table A.2.

The three main variables interacting with religious attendance were education, work amount, and income. The main result found was that those who reported no attendance and had either low education level (0-8 grades), low work hours (0-20 hrs/wk), or low income (low 25 % [\leq \$20,516]), reported lower health scores than those who reported attending more frequently.

*Two-Way Interaction Model: Attendance*Education*

The interaction between attendance and education was significant. For the highest level of attendance (“>1/wk”), those with less than a high school education had a slightly higher mean physical health score than those with some high school education. Moreover, comparing these two education groups at the lowest level of attendance (“not at all”), the physical health score for those with less than a high school education was dramatically lower than it was for those with some high school education (B=-8.7 [-15.7,-1.8] CI 95%, p=0.01) or some college/graduate school education (B=-9.2 [-16.2, -2.3] CE 95%, p = 0.01; refer to Figure A.1 and Table A.2). For those with less than a high school education (and across all education levels), the highest mean health scores were reported at moderate attendance (“1-3/mth”; refer to Figure A.1). This indicates that the less-educated may benefit more from attending religious services than those with more years of education.

*Two-Way Interaction Model: Attendance*Work*

For the model with one interaction of attendance with work amount, all levels of attendance with work amount were significant. Among those who report working “< 20 hrs/wk” (in the past calendar year, 1999), religious attendance frequency was associated with a curvilinear result in health scores. Mean health scores increased slightly as attendance became less frequent, but at no attendance, the mean health score dropped sharply. The highest health score among those working “< 20 hrs/wk” was infrequent attendance, and the lowest health score was reported among those who attend “not at all” (refer to Figure A.2 and Table A.2). For those who reported working “>20 hrs/wk,” frequency of attendance made little difference in the physical health score, but with physical health scores that were much higher overall compared with those of people who work “<20 hrs/wk.” This indicates that those who work less benefit more from attending religious services than those who work more.

*Two-Way Interaction Model: Attendance*Income*

For the model with the interaction of attendance with income, those who reported the lowest 25 percent income level ($\leq \$20,516$) had lower physical health scores with less religious attendance, particularly when attendance was reported as “not at all,” compared with that of those with higher incomes (mid-50% to top 25%, for which frequency of religious attendance had little association with reported physical health score; refer to Table A.2 and Figure A.3). For those with the lowest 25 percent income, the highest health score occurred for those who reported attending “ $>1/wk$,” with lower health score as attendance decreased. For those with higher incomes (mid-50 to top 25%), the best physical health scores occurred at moderate attendance (“1-3/mth” to “ \leq several/yr.”), with the lowest scores at “not at all.” This indicates that those with low income benefit more from attending more frequently than those with higher income.

*Multiple Two-Way Interaction Model: Attendance*Education, Attendance*Work and Attendance*Income*

In order to further understand how the two-way interactions interacted with each other, or how two or more sociodemographic variables may each have affected the way religious attendance influences health, multiple two-way interaction models were analyzed (refer to Figure A.4, Figure A.5, and Figure A.6).

The model with three two-way interactions present (attendance*education, attendance*work, and attendance*income) showed trends that were similar to those obtained with each of the models with one interaction. For those with lowest education “ $<$ high school,” low work “ <20 hrs/wk,” and low income “ $\$<20,600$,” mean physical health scores each showed a dramatic decrease in reported health score values at attendance level “not at all” (refer to Figure A.4, Figure A.5, and Figure A.6). Those

with higher education, work amount, and income showed random variability with no trend across categories, and no significant difference across each level of attendance (but with higher health scores overall compared with those for the low education, low work amount, and low income groups). This indicates that those with low SES benefit more from some attendance than no attendance.

*Two Three-Way Interaction Model: (Attendance*Income*Work) and (Attendance*Income*Education)*

A model with the two three-way interactions (attendance*income*work and attendance*income*education) was also found to be significant (refer to ANOVA Table A.1). Overall, those with low-to-mid income (“lowest 25%” to “mid 50%”) and low work time “<20 hrs/wk,” reported the lowest physical health scores compared with those who reported the highest income, “top 25%,” and more work time, “>20 hrs/wk,” across attendance levels, particularly at no attendance.

For work amount of “>20hrs/wk” for the mid 50 percent and top 25 percent income levels, mean PCS scores were higher across religious attendance levels compared with the lowest 25 percent income, particularly at the no attendance level. However, at attendance of “1/wk” the top 25 percent income had the lowest PCS mean score of all income levels and attendance levels.

At the highest education level, “>high school,” those with the lowest 25 percent income had the lowest health scores compared with those with the highest income (top 25%) at religious attendance “>1/wk” relative to reported attendance level “not at all.”

Results for Objective I.2 Mental Health (SF-12 MCS) Association with Religious Attendance Frequency

Simple Model: Mental Health and Religious Attendance (with controls and no interactions)

Cross-sectional analysis was performed on the relationship between religious attendance and mental health (measured as SF-12 Mental Composite Score [MCS]). Key sociodemographic variables were controlled for, including gender, race, marital status, education, number of children, work amount, income, and residence (rural vs. urban). The following variables—religious affiliation, region, occupation, and poverty status—were included as controls in a preliminary analysis but were dropped in the final model because they were not found to be significant. For the simple model (in the presence of controls, with no interactions), religious attendance was not significantly related to mental health (refer to Table 4.10). The mean scores for mental health were consistent (52.7 to 52.9) across levels of religious attendance, except for attendance “1/wk,” with a lower mental health score ($\mu = 52.3$; refer Figure 4.2). These scores were higher than the national average (ages 35-44) at 50.1. As indicated in Table 4.10, females had a lower mean mental health score (thus poorer mental health) relative to males ($B = -2.0$ [-2.7, -1.2] CI 95%, $p = 0.00$). Those with higher mean mental health scores (thus better mental health) were those working >20 hrs/wk ($B = 3.6$ [2.6, 4.7] CI 95%, $p = 0.00$), and those with incomes at levels of mid-50 percent ($B = 1.4$ [0.3, 2.5] CI 95%, $p = 0.01$) to top 25 percent ($B = 2.4$ [1.0, 3.8] CI 95%, $p = 0.00$). Place of residence was significant only for those whose residence was reported as “unknown” ($B = 5.0$ [2.3, 7.7] CI 95%, $p = 0.00$). Place of residence was not significant for models with the dependent variable of physical health (PCS) or CES-Depression.

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

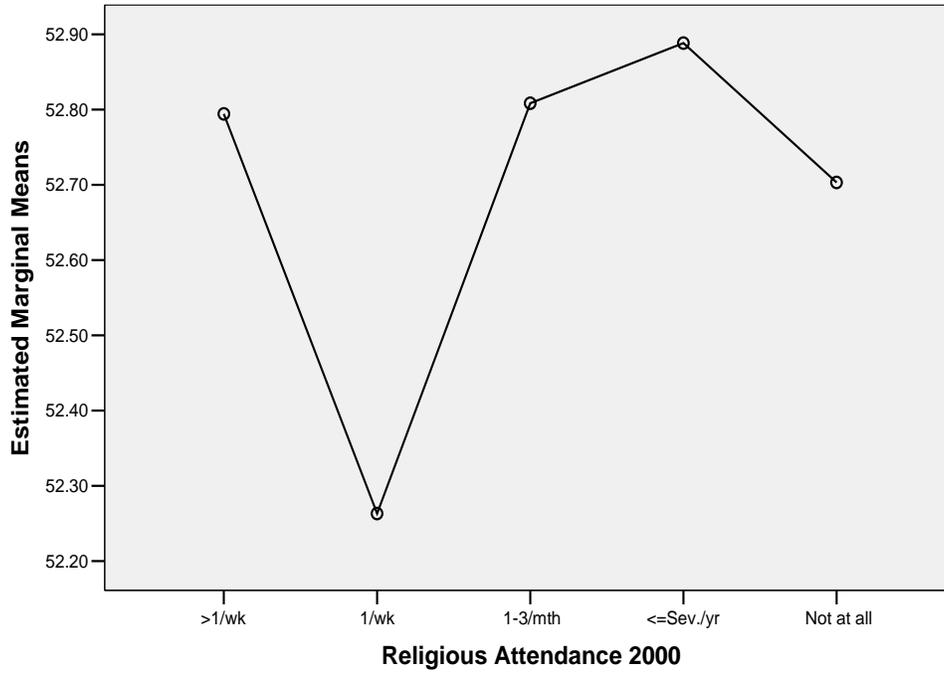


Figure 4.2 Obj. I. Simple Model. Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 2000 (controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, children living in household, work amount in 1999, net family income in 1999, residence and region).

Interactions in Models with Outcome Variable of Mental Health Composite Score

(MCS) Model: Interaction Models, Attendance with Race/Ethnicity and Education

*Two-Way Interaction Model: Attendance*Race/Ethnicity*

The interaction of attendance with race/ethnicity was found to be significant. The significant interaction occurred between African Americans and higher frequencies of religious attendance of more than once per week to once per month (refer to Table A.3).. African Americans who attended the most frequently, more than once per week, had the highest reported scores for mental health (within their ethnic/racial group and

among other ethnic/racial groups). African Americans had generally lower mental health scores with decreasing attendance, with the lowest health score at the attendance level of “not at all.” The ethnic/racial group of Caucasians and others showed the opposite trend, revealing better mental health scores with decreasing attendance (refer to Table A.3 and Figure A.7).

In an attempt to better understand the differences in mental health outcomes among the three race/ethnicities, regression models were run separately for each race and ethnicity. This analysis is described at the end of Chapter 4 and Objective 1.4, and in Table 4.11, Figure 4.4, Figure 4.5, and Figure 4.6.

*Two-Way Interaction Model: Attendance*Education*

The interaction of education level with attendance significantly influenced mental health scores. For those who attended religious services once per week, individuals with less than a high school education had much lower mental health scores than those with some high school education or more; however, this low education group had higher mental health scores at attendance levels “>1/wk” and “1-3/mth” compared with the other educational levels (refer to Table A.3).

*Multiple Two-Way Interaction Model: Attendance*Race/Ethnicity and Attendance*Education*

A similar interaction effect of race and attendance was apparent in the model that included the presence of the interaction of attendance with education. The lowest mental health score for all ethnicities was at attendance of once per week (refer to Figure A.9). The same interaction trend for attendance with education was also present in the model that included the additional interaction of attendance with race (refer to Figure A.10).

*Three-Way Interaction Model: Race/Ethnicity*Education*Attendance*

A three-way interaction of race, education, and attendance was found to be significant at the level of some high school and some college/graduate school education, and for the racial group Hispanics at the level of attendance of once per week relative to no attendance. The general trend for the education level of some high school was that Hispanics as well as African Americans reported better mental health scores with more frequent attendance, whereas Caucasians and others showed the opposite trend. For the education level of some college or more, comparing the scores of Caucasians and others with those of Hispanics and African Americans, the mental health scores of the latter two groups were higher at the most frequent attendance level of more than once per week, decreasing at once per week, then increasing in score as attendance levels decreased from moderate to no attendance. For the most frequent attendance level, more than once per week, Hispanics and African Americans reported much better mental health relative to Caucasians and others. Overall, it appeared that African Americans and Hispanics had better mental health with high attendance of more than once per week compared with Caucasians. Note, however, that health scores fluctuated across attendance levels by ethnicity and education. The interactions were explored and are discussed here, but the tables and figures are not included because of the fluctuation in health scores and a lack of consistent and obvious patterns for these interactions.

Results for Objective I.3 Depression (CES-D) Association with Religious Attendance

Frequency

Simple Model: Depression and Religious Attendance (with controls and no interactions)

Cross sectional analysis was performed on the relationship between religious attendance and CES-Depression scores. The following sociodemographic variables were controlled for: gender, race, marital status, education, number of children, work amount, income, and region of residence within the United States. The following variables—religious affiliation, occupation, residence, and poverty status—were included as controls in a preliminary model but were dropped because they were not found to be significant (refer to Table 4.4).

For the simple model (in the presence of controls, with no interactions), frequency of religious attendance was not significantly related to the depression score (refer to Table 4.10). A decreasing curve-shaped trend occurred across levels of religious attendance with an increase at the no attendance level (refer to Figure 4.3). The highest mean depression score occurred at the highest level of attendance, more than once per week ($\mu = 4.9$; a score of 6 or more was an indicator for depression). Lower scores for depression occurred with low attendance levels (“1/wk” to infrequent, $\mu = 4.7$ to 4.3). A very slight increase in the mean depression score occurred at the no attendance level, increasing from the infrequent attendance level. ($\mu = 4.5$; refer to Figure 4.3). The sociodemographic characteristics that were related to higher mean depression scores were being female ($B=0.9$ (0.6,1.3) CI 95%, $p=0.00$), African American ($B=0.5$ (0.1, 1.0) CI 95%, $p=0.02$), divorced ($B=1.0$ (0.4,1.6) CI 95%, $p=0.00$), and living in the region of the South ($B=0.7$ (0.1,1.2) CI 95%, $p=0.01$) (refer to Table 4.10). The variable for region of residence in the U.S. was not significant for models with the dependent variable of physical (PCS) or mental health (MCS).

Estimated Marginal Means of CES-Depression Score

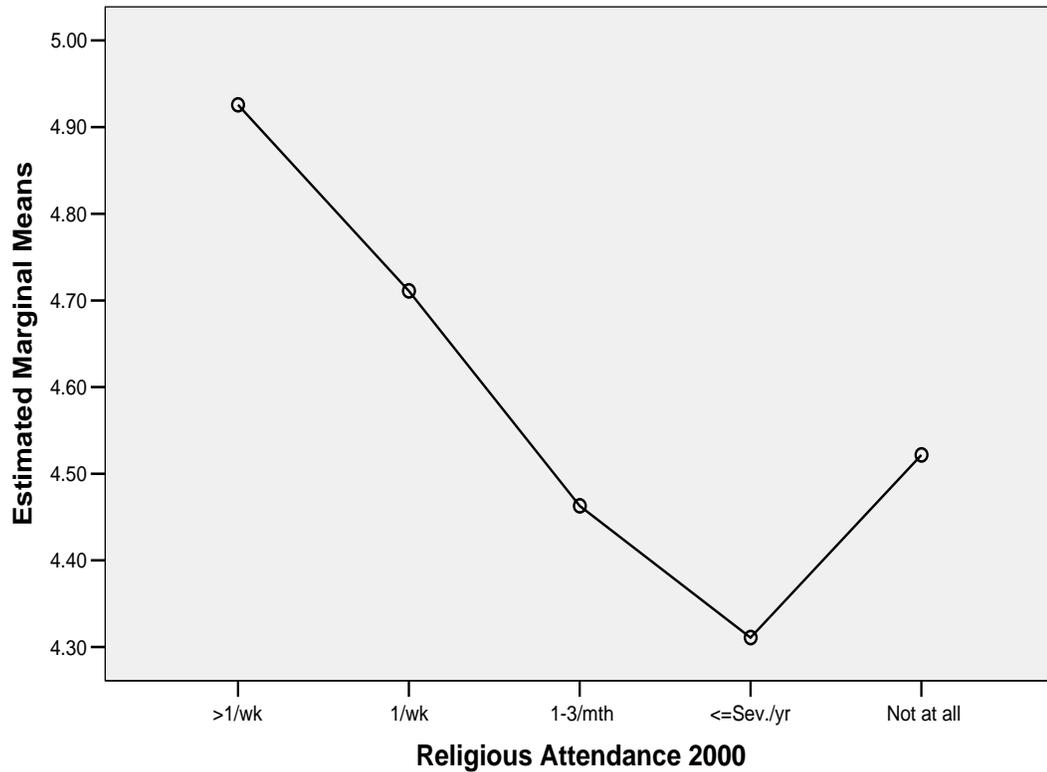


Figure 4.3 Obj. I. Simple Model. CES-Depression in 2000 by Religious Attendance in 2000 (controlling for sociodemographic variables in 2000 of gender, race/ethnicity, marital status, education, children living in household, work amount in 1999, net family income in 1999, residence and region).

Having a lower mean depression score was related to working less than twenty hours per week ($B=-2.0$ $[-2.5,-1.5]$ CI 95%, $p=0.00$), and having an income at the level of top 25 percent ($B=-2.2$ $[-2.9,-1.5]$ CI 95%, $p=0.00$) to mid 50 percent ($B=-1.8$ $[-2.4,-1.3]$ CI 95%, $p=0.00$; refer to Table 4.10).

Interactions in Models with the Outcome Variable of CES-Depression Model:

Interaction Models, Attendance with Race/Ethnicity and Marital Status

*Two-Way Interaction Model: Attendance*Race/Ethnicity*

The interaction of race/ethnicity with attendance was found to be significant for the cross-sectional model of the dependent variable of CES-Depression (refer to Table A.4). The significant interaction occurred between African Americans and higher frequencies of religious attendance from more than once per week to once per month. African Americans who attended more frequently scored lower for depression than African Americans who did not attend (refer to Figure A.11). However, the ethnic/racial group Caucasians and others reported higher scores for depression with increased frequency of attendance compared with the scores of African Americans. This same trend occurred with the mental health composite score (MCS) outcome as well.

In an attempt to better understand the differences in depression outcomes among the three race/ethnicities, regression models were run separately for each race and ethnicity (refer to Table 4.12 and Figure 4.7, Figure 4.8 and Figure 4.9). This is further explained toward the end of Chapter 4, in Objective 1.4.

*Two-Way Interaction Model: Attendance*Marital Status*

There was an interaction at the most frequent attendance level of more than once per week and the marital status of widowed or separated. Widowed or separated who attended more than once per week had the lowest depression score for any of the marital status groups and the highest depression score if they did not attend at all (refer to Table A.4 and Figure A.12). In contrast, married who attended more than once per week had higher depression scores than those who never attended.

Three-Way Interaction Model: Attendance Race/Ethnicity*Marital Status*

A three-way interaction of race/ethnicity, marital status, and attendance was found to be significant mainly for the race of Hispanics and marital status of widowed/separated at moderate attendance level (1-3/mth), although there was a problem with low numbers among the sub-categories, so the results may not be reliable. Widowed or separated Hispanics and African Americans who attended moderately, once to three times per month, scored lower for depression than those who did not attend. Likewise, divorced Hispanics who attended moderately scored low for depression compared with those who did not attend at all. The opposite trend was present for Caucasians and others who were widowed/separated and attended moderately (as this group scored high for depression compared with the no attendance group).

Objective 1.4 Simple Regression Model of Mental Health Composite Score (MCS) and CES-Depression (CES-D) Run Separately by Race/Ethnicity and Gender

In the analysis of the simple and full regression models for mental health (refer to Table A.3) and depression (refer to Table A.4), females were found to have significantly poorer mental health and to be more depressed than males. In addition, the interaction of race/ethnicity and religious attendance was found to be significantly related to mental health and depression. African Americans who attended religious services more frequently reported better mental health scores (refer to Table A.3 and Figure A.7) and lower depression scores (Table A.4 and Figure A.11) than African Americans who did not attend at all, while the reverse trend occurred for Caucasians and all others. Separate regression models for each gender and each race/ethnicity were performed to better study the differences between men and women and African Americans and Caucasians in mental health and depression scores relative to religious attendance levels.

It is useful to run separate regression models for each level of gender and race/ethnicity, rather than to force multiple interactions in one overall model (which becomes difficult to interpret), because this procedure allows comparisons among the regression models for each separate gender and for each separate race/ethnicity, producing the effect of simultaneous interactions of gender (or race/ethnicity) with all the other independent control variables in the model. Using the statistical program SPSS version 13.0, a split file was created to run separate regression models for each gender, male and female. Another split file was created to run separate regression models for each of the three main race/ethnicity groups present in the dataset: (1) Hispanic, (2) African American, and (3) Caucasian and all others.

Simple Regression Model of Mental Health Composite Score (MCS) by Gender

The separate regression models by gender for males and females were compared for each health outcome. The differences were not worthy of special note. The religious attendance variable was not significant for the separate regression models by males and females for the mental health or depression outcome variables. Separate regression models by gender were also run for the outcome variable of physical health. Some of the religious attendance levels were found to be significant in the model run only for females in the physical health model. The female-only model revealed a U-shaped trend similar to the overall physical health model, but with slightly lower scores (with better health scores at attendance levels of once per week to infrequent and lower health scores at the two extremes of attendance, greater than once per week and not at all) (refer to Table 4.10 and Figure 4.1). None of the religious attendance levels were significant in the physical health model run only for males (although the physical health scores for the male-only model were higher than for the overall model and for the female-only model, with a U-shaped curve similar to the overall model).

Simple Regression Models of Mental Health Composite Score (MCS) for African Americans compared to Caucasians and all others

The separate regression models by race/ethnicity produced interesting significant relationships with the dependent health outcome variables of mental health and depression, but not for the outcome variable of physical health. The details of the results are described in the following paragraphs.

None of the parameter estimates for any of the levels of the independent variable of religious attendance were significantly associated with the dependent variable of mental health in the overall simple model (before separating by race/ethnicity) (refer to Table 4.10). However, some parameter estimates for the levels of religious attendance were significantly related to mental health in the regression models run separately for African American and Caucasians and all others (refer to Table 4.11). None of the religious attendance levels were significant in the regression model run separately for Hispanics (refer to Table 4.11).

There was a striking contrast in mental health composite scores by religious attendance levels between the two race/ethnicities of African Americans and Caucasians. African Americans who attended more frequently, particularly at more than once per week, reported higher (better) mental health scores than African Americans who did not attend at all, almost three points higher in an average mental health score ($B=2.9$, $p=0.04$; refer to Table 4.11 and Figure 4.5). Hispanics showed a trend similar to African Americans, although the trend was not significant (refer to Table 4.11 and Figure 4.4).

The reverse trend in mental health scores by religious attendance occurred for Caucasians and all others compared to African Americans. Caucasians and all others who reported more frequent attendance reported lower (poorer) mental health scores, in an obvious linear trend (refer to Table 4.11 and Figure 4.6). Caucasians and all others who attended more than once per week reported an average mental health composite score two points lower than those who never attended ($B=-2.0$, $p=0.04$; refer to Table 4.11, Figure 4.6).

The amount of variance in mental health scores which each model explained was the highest in the model for African Americans (adjusted $R^2 = 0.106$; refer to Table 4.11). This explained variance in mental health scores for the model of African Americans was almost double compared to the variance in mental health scores explained by the overall model (adjusted $R^2 = 0.068$; refer to Table 4.10) and the variance in mental health scores explained by the model for Caucasians and others (adjusted $R^2 = 0.048$; refer to Table 4.11).

The other sociodemographic variables that were significantly related to mental health for African Americans were gender, work amount, and residence (refer to Table 4.11).

African American females reported a lower average mental health score than African American males by 3.5 points. In contrast, Caucasians and all other females reported only 1.4 points lower in average mental health scores compared to Caucasian and all other males (refer to Table 4.11).

African Americans who reported working 20 hours or more per week also reported higher average mental health scores by 5.4 points compared to those who worked less

than 20 hours per week. Caucasians and all others who worked 20 or more hours per week only reported average mental health scores 1.5 points higher compared to those who worked less than 20 hours per week (refer to Table 4.11).

African Americans who lived in an urban environment reported 6.2 points lower in average mental health scores compared to those whose residence was unknown. Caucasians and all others who lived in an urban residence reported only 3.3 points lower in average mental health scores compared to those whose residence was unknown, and only one point lower in average mental health scores for those whose residence was rural compared to an unknown residence (refer to Table 4.11).

Interestingly, the sociodemographic variables of education, number of children living in the household, and income were not significantly related to mental health composite scores for African Americans; however, these sociodemographic variables were significantly related to mental health composite scores for Caucasians and all others (refer to Table 4.11).

Caucasians and all others who reported some education beyond high school reported average mental health scores 3.6 points higher than those with no high school education (refer to Table 4.11).

Caucasians and all others who reported living in the same household with one child reported 1.5 lower average mental health scores than those living with no children. Caucasians living with two or more children were not significantly different from those living with no children (refer to Table 4.11).

Caucasians who reported income in the top 25th to mid 50th percentiles reported average mental health scores of 1.8 and 1.5 points higher, respectively, compared to those who reported income in the lowest 25th percentile (refer to Table 4.11).

The marital status of being divorced was borderline significantly related to slightly lower mental health scores ($B=-1.1$, $p=0.10$) compared to the unmarried in the overall model (refer to Table 4.10), but not in any of the separate models run for each race/ethnicity (refer to Table 4.11).

It should also be pointed out that because the observed relationship between religious attendance and mental health and depression scores is cross-sectional, during the year 2000, attempts to explain causality can not be determined. For example, it is unclear whether those Caucasians who attend more frequently do so in order to cope with pre-existing poorer mental health and depression. Perhaps with no attendance, these frequent attenders with poor mental health and depression would have even worse mental health and depression. In an attempt to address the issue of causality, the effects of religious attendance in young adulthood (during the year 1982) on mid-adulthood mental health and depression as well as physical health were examined (during the year 2000), controlling for baseline health status in 1981 and other sociodemographic factors (during the years 1982 and 1998), as discussed in Chapter 5.

Table 4.11 Obj. I. Parameter Estimates of Simple Models of Dependent Variable Mental Health Composite Score (SF-12 MCS) in 2000 run separately by each Race/Ethnicity (Hispanics, African Americans and Caucasians and all others; controlling for sociodemographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999, and residence).

Independ. Var. in 2000 Parameter	Hispanics MCS				African Americans MCS				Caucasians and all others MCS			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	45.9	.00	40.6	51.2	48.0	.00	42.6	53.5	48.7	.00	44.1	53.2
Rel. Attend. >1/wk (RA)	1.1	.59	-2.8	4.9	2.9	.04	.1	5.8	-2.0	.04	-3.9	-1
RA 1/wk	-.1	.93	-3.6	3.3	.7	.55	-1.7	3.2	-1.7	.08	-3.5	.2
RA 1-3x/mth	-.2	.92	-3.8	3.4	1.6	.19	-.8	4.0	-1.1	.29	-3.0	.9
RA <=Sev.x/yr (Infreq.)	-.6	.74	-4.2	3.0	1.3	.31	-1.2	3.9	-.5	.62	-2.4	1.5
RA Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-1.2	.22	-3.1	.7	-3.5	.00	-5.1	-1.9	-1.4	.00	-2.4	-.4
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Widow/Separated	2.0	.35	-2.2	6.1	-2.6	.04	-5.0	-1	1.1	.49	-2.0	4.2
Divorced	.0	.99	-3.5	3.4	-1.0	.36	-3.1	1.1	-.8	.41	-2.8	1.1
Married	.9	.55	-2.1	3.9	-.9	.38	-3.0	1.2	1.0	.29	-.9	2.8
Never Married	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
> High School (HS)	.5	.79	-3.1	4.0	-.9	.73	-4.1	5.8	3.6	.07	-.3	7.4
High School	-1.3	.44	-4.7	2.1	.5	.85	-4.4	5.3	2.8	.15	-1.0	6.7
< High School	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
>=2 Children	.1	.92	-2.4	2.7	.8	.41	-1.1	2.7	.1	.88	-1.2	1.4
1 Child	1.4	.36	-1.6	4.3	.3	.78	-1.8	2.4	-1.5	.05	-3.0	.0
No Children	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work>20 hrs/wk (FT)	6.7	.00	4.2	9.3	5.4	.00	3.4	7.4	1.5	.03	.1	2.9
0-20 hrs/wk (PT)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income Missing	1.6	.30	-1.4	4.7	-.5	.66	-2.6	1.6	.4	.66	-1.4	2.3
Income Top 25%	2.5	.17	-1.1	6.1	2.1	.18	-1.0	5.1	1.8	.05	.0	3.6
Income Mid 50%	1.6	.26	-1.2	4.3	.2	.83	-1.8	2.3	1.5	.07	-.1	3.0
Income Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence: Unknown	5.5	.14	-1.9	12.8	6.2	.01	1.6	10.8	3.3	.09	-.5	7.1
Rural	.4	.76	-2.2	3.1	.0	.99	-2.0	2.1	1.0	.06	.0	2.0
Urban	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Adj. R Square	0.097				0.106				0.048			
Corrected Model df	18				18				18			
Error df	356				606				1024			
Total df	375				625				1043			
F	3.2				5.1				3.9			
Sig.	0.00				0.00				0.00			

Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS) 2000

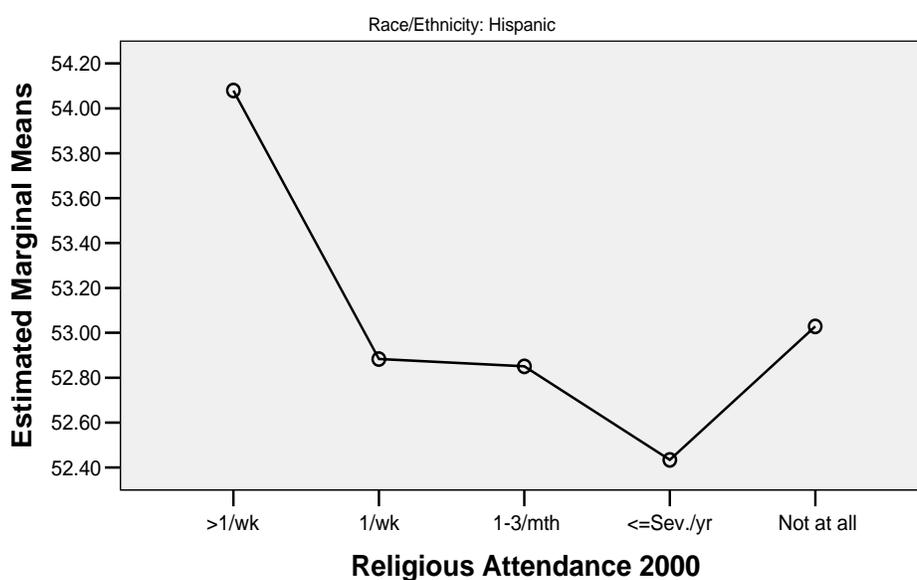


Figure 4.4 Obj. I. Simple Model for Hispanics: Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 2000 (controlling for socio-demographic variables in 2000 of gender, marital status, education, children living in household, work amount in 1999, net family income in 1999, and residence.

**Estimated Marginal Means of Mental Health Composite Score
(SF-12, MCS) 2000**

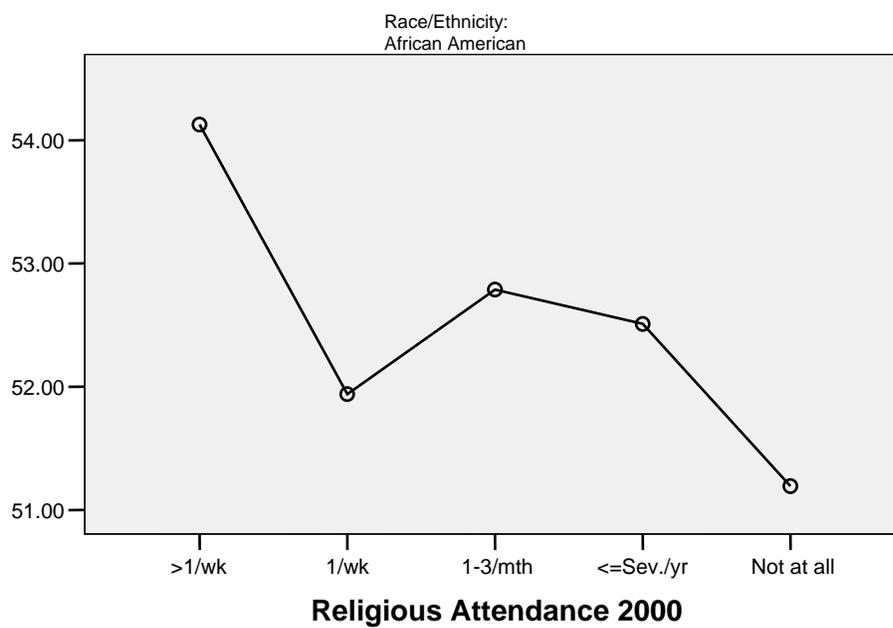


Figure 4.5 Obj. I. Simple Model for African Americans: Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 2000 (controlling for sociodemographic variables in 2000 of gender, marital status, education, children living in household, work amount in 1999, net family income in 1999, and residence).

**Estimated Marginal Means of Mental Health Composite Score
(SF-12, MCS) 2000**

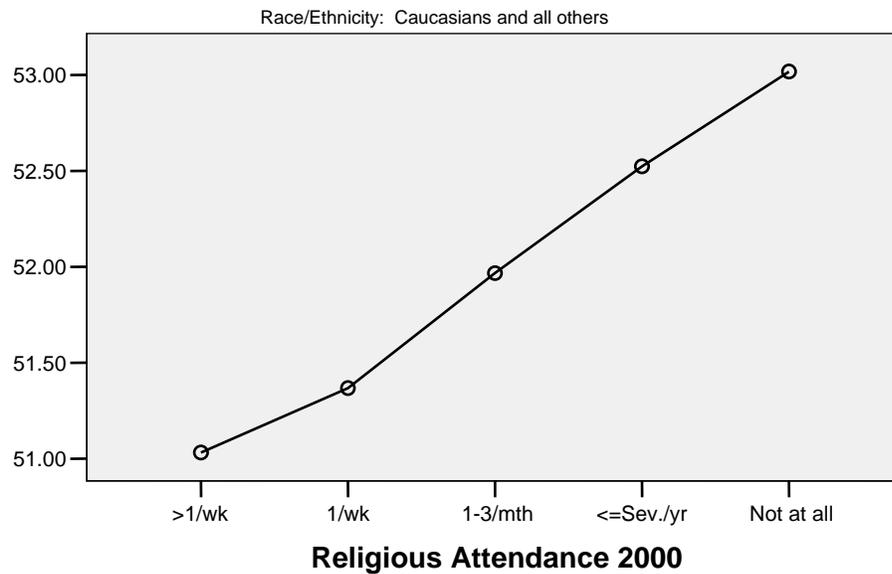


Figure 4.6 Obj. I. Simple Model for Caucasians and all others: Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 2000 (controlling for gender, marital status, education, children living in household, work amount in 1999, net family income in 1999, and residence).

Simple Regression Models of CES-Depression (CES-D) for African Americans compared to Caucasians and all others

None of the religious attendance levels were significantly related to depression scores in the simple overall model (refer to Table 4.10). However, when the same simple model was run separately for each race/ethnicity, particularly for African Americans and Caucasians and all others, some of the religious attendance levels became significantly related to the outcome variable of depression (as was the case described previously for the outcome variable of mental health; compare Table 4.11 to Table 4.12). None of the religious attendance levels were significantly related to depression in the regression model run separately for Hispanics (refer to Table 4.12; Figure 4.7). Therefore, the two separate models for African Americans and Caucasians and all others were compared, as described in the following paragraphs.

African Americans who reported attending moderately often, about one to three times per month, reported being less depressed (with lower average depression scores of -1.2) compared to those who reported never attending (refer to Table 4.12 and Figure 4.8). In contrast, Caucasians and all others who reported attending frequently, at more than once per week or about once per week, reported higher (poorer) average depression score of 1.2 to 0.8 points, respectively, compared to those who reported never attending (refer to Table 4.12 and Figure 4.9).

The amount of variance in depression scores was similar for the overall model (adjusted (adjusted $R^2 = 0.146$; refer to Table 4.10), as well as for each model for the three separate race/ethnicities, Hispanics, African Americans, Caucasians and all others, with respective adjusted R squares of 0.160, 0.132, and 0.131 (refer to Table 4.12).

The other sociodemographic variables which were significantly related to depression for African Americans were gender, marital status, work amount, income, and region in the United States the respondent reported living in (refer to Table 4.12). The overall model (refer to Table 4.10) as well as the Caucasian and all others model (refer to Table 4.12), reported similar significant sociodemographic variables related to depression, with only slight differences from the model for African Americans.

African American females reported a higher (poorer) average depression score compared to African American males by 1.5 points. In contrast, Caucasian and all other females reported only a 0.7 point higher (poorer) average depression score compared to Caucasian and all other males (refer to Table 4.12).

African Americans whose marital status was reported as divorced had a 0.9 higher (poorer) average depression score compared to African Americans who reported never being married (similar results were observed in the overall model; refer to Table 4.10). Divorce was not significantly related to depression in the model for Caucasians and all others (refer to Table 4.12).

African Americans who reported working 20 hours or more per week also reported a lower (better) average depression score by -2.2 points compared to those who worked less than 20 hours per week. Caucasians and all others who worked 20 or more hours per week reported average depression scores only -1.3 points lower compared to those who worked less than 20 hours per week. African Americans who reported income in the top 25th to mid-50th percentiles reported lower average depression scores of -2.2 and -1.5, respectively. Similar results for income and depression were found for the

model with Caucasians (refer to Table 4.12) as well as the overall model (refer to Table 4.10).

African- Americans who reported living in the South reported a one-point higher (poorer) average depression score compared to those who reported living in the Northeast, while Caucasians and all others who reported living in the West, South, and North Central regions of the United States reported slightly higher average depression scores compared to those living in the Northeast ($B=0.8, 0.7, \text{ and } 0.7$ respectively, $p \leq 0.05$; refer to Table 4.12).

One of the other slight differences among the depression models for African Americans, Caucasians and all others, and the overall model was the relationship to the number of children living in the household with the respondent and depression scores. Caucasians and all others who reported living with a child reported a slightly higher average depression score of 0.9 compared to those living with no children, although this relationship to depression was not significant for respondents who reported living with two or more children. However, the number of children living with the respondent was not significantly related to depression for either the model for African Americans (refer to Table 4.12) or for the overall model (refer to Table 4.10).

As stated previously, it is uncertain why African Americans who attend more frequently have less depression than those who do not attend, while Caucasians who attend more frequently have more depression than those who do not attend (refer to Table 4.12). One possible explanation may be that African Americans derive additional benefits from religious participation compared to Caucasians, such as social, civic, and material resources and support, while Caucasians and others may

have be able to obtain these additional “nonreligious” benefits from other, nonreligious community participation (Franzini, L., Ribble, J.C., Wingfield, K. A. 2005). Further research to investigate the differences in mental health and depression outcomes needs to be pursued to better understand the differences among African Americans and Caucasians and others.

Table 4.12 Obj. I. Parameter Estimates of Simple Models for the Dependent Health Variable CES-Depression Score (CES-D) in 2000 run separately by each Race/Ethnicity (Hispanics, African Americans and Caucasians and all others; controlling for sociodemographic variables in 2000 of gender, marital status, education, children living in household, work amount in 1999, net family income in 1999, and region).

Independ. Var. in 2000 Parameter	Hispanics CES-D				African Americans CES-D				Caucasians & others C-ESD			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	7.6	.00	4.9	10.4	6.7	.00	3.8	9.5	5.3	.00	3.0	7.5
Rel. Attend. >1/wk (RA)	-.2	.80	-2.1	1.6	-.5	.52	-1.9	1.0	1.2	.01	.3	2.1
RA 1/wk	.3	.74	-1.4	1.9	-.6	.33	-1.8	.6	.8	.08	-.1	1.7
RA 1-3x/mth	.9	.34	-.9	2.6	-1.2	.06	-2.3	.0	.5	.33	-.5	1.4
RA <=Sev.x/yr (Infreq.)	.6	.50	-1.1	2.3	-.9	.16	-2.2	.4	.1	.86	-.9	1.0
RA Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	.5	.30	-.4	1.4	1.5	.00	.8	2.3	.7	.00	.3	1.2
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Widow/Separated	-.1	.91	-2.1	1.9	.9	.16	-.4	2.1	-.9	.23	-2.4	.6
Divorced	1.3	.11	-.3	3.0	.9	.09	-.1	2.0	.8	.11	-.2	1.7
Married	.3	.66	-1.1	1.8	-.2	.73	-1.2	.9	-.6	.19	-1.5	.3
Never Married	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
> High School (HS)	-.7	.43	-2.4	1.0	-1.0	.44	-3.5	1.5	-1.5	.12	-3.3	.4
High School	.7	.40	-.9	2.3	-.5	.69	-2.9	1.9	-.7	.46	-2.5	1.1
< High School	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
>=2 Children	-.4	.55	-1.6	.9	-.4	.39	-1.3	.5	.1	.87	-.6	.7
1 Child	-.7	.37	-2.1	.8	-.4	.46	-1.5	.7	.9	.01	.2	1.7
No Children	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work>20 hrs/wk (FT)	-3.5	.00	-4.7	-2.3	-2.2	.00	-3.1	-1.2	-1.3	.00	-2.0	-.7
0-20 hrs/wk (PT)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income Missing	-1.3	.09	-2.8	.2	-.4	.43	-1.5	.6	-1.3	.01	-2.1	-.4
Income Top 25%	-1.7	.05	-3.5	.0	-2.2	.01	-3.7	-.6	-2.0	.00	-2.9	-1.2
Income Mid 50%	-1.8	.01	-3.1	-.5	-1.5	.01	-2.5	-.4	-1.8	.00	-2.6	-1.1
Income Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region: West	-1.1	.11	-2.4	.2	.7	.35	-.8	2.3	.8	.04	.1	1.6
South	.0	.99	-1.4	1.4	1.0	.08	-.1	2.1	.7	.05	.0	1.4
North Central	-1.2	.26	-3.2	.9	.8	.19	-.4	2.1	.7	.05	.0	1.3
Northeast	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Adj. R Square	0.16				0.132				0.131			
Corrected Model df	19				19				19			
Error df	359				611				1028			
Total df	379				631				1048			
F	4.8				6.1				9.3			
Sig.	0.00				0.00				0.00			

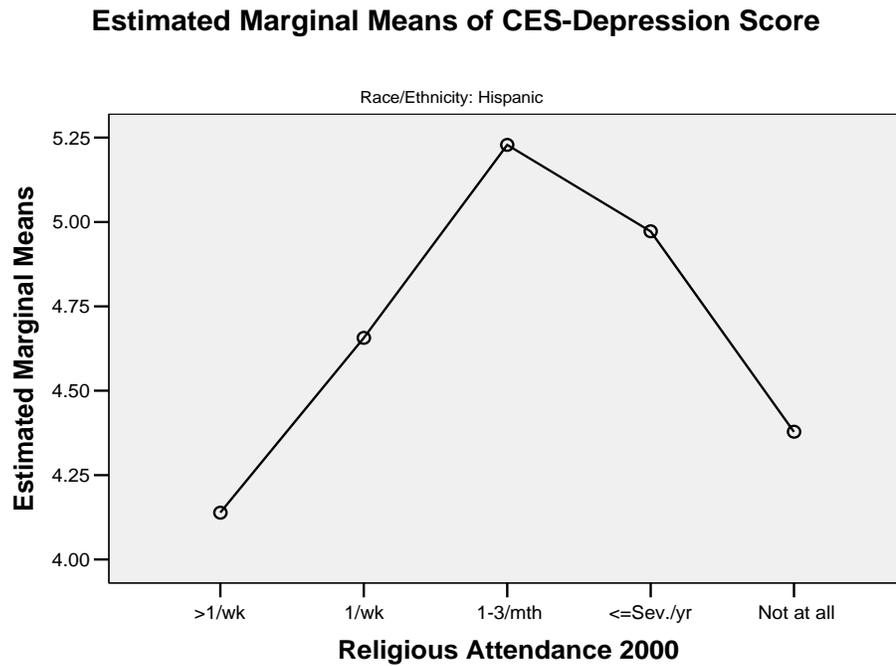


Figure 4.7 Obj. I. Simple Model for Hispanics: CES-Depression Score (CES-D) in 2000 by Religious Attendance in 2000 (controlling for sociodemographic variables in 2000 of gender, marital status, education, children living in household, work amount in 1999, net family income in 1999 and region).

Estimated Marginal Means of CES-Depression Score

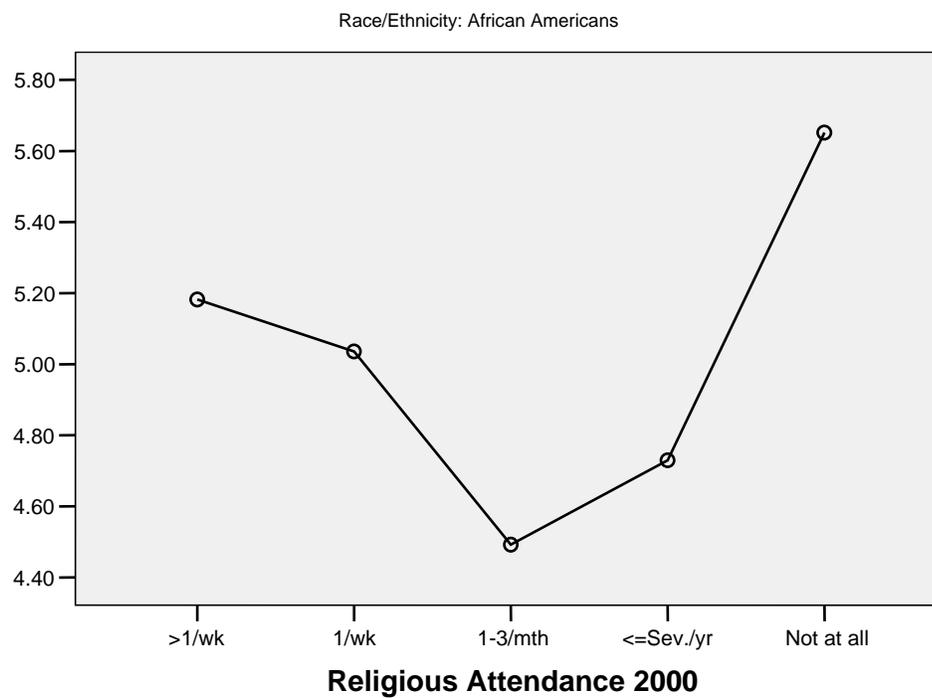


Figure 4.8 Obj. I. Simple Model for African Americans: CES-Depression Score (CES-D) in 2000 by Religious Attendance in 2000 (controlling for sociodemographic variables in 2000 of gender, marital status, education, children living in household, work amount in 1999, net family income in 1999 and region).

Estimated Marginal Means of CES-Depression Score

Race/Ethnicity: Caucasians and all others

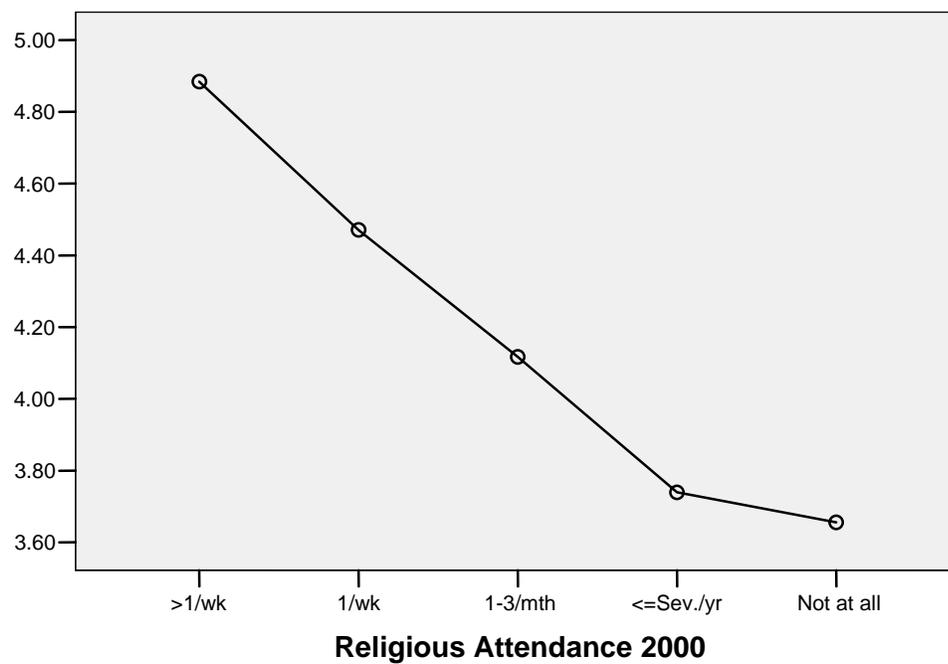


Figure 4.9 Obj. I. Simple Model for Caucasians and all others: CES-Depression Score (CES-D) in 2000 by Religious Attendance in 2000 (controlling for sociodemographic variables in 2000 of gender, marital status, education, children living in household, work amount in 1999, net family income in 1999 and region).

Discussion Section Objective I

Objective I Summary of Findings:

Objective I.1 Religious Attendance and Physical Health Results Summary

With respect to Objective I, investigating the cross-sectional analysis of religious attendance on physical health, mental health, and depression for the year 2000, the following overall trends were found. For the Physical Health Composite Score (PCS), frequency of religious attendance was found to have a curvilinear association with physical health, in a simple model with the presence of sociodemographic control variables in 2000 (including gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999, region and residence; refer to Table 4.10). The lowest physical health scores occurred at the two extremes of attendance, more than once per week and no attendance at all (refer to Table 4.10 and Figure 4.1).

The full model of three two-way interactions of low work amount (part-time or less) in the past calendar year 1999, low education in the year 2000 (less than high school), and lowest 25 percent net family income level in the past calendar year (less than \$20,600), with religious attendance in the year 2000 reveals a curvilinear trend as well, particularly with lowest mean physical health scores at the level of no attendance (refer to Table A.2, Table A.2, Figure A.4, Figure A.5, and Figure A.6). In addition to the interacting variables, the model was run in the presence of sociodemographic control variables in 2000 including gender, race/ethnicity, marital status, and number of children living in the household. Aside from the interactions of attendance with work amount, education, and income, there were no significant simple main effects

except for number of children living in the household, which had a positive association with physical health.

Objective I.2 Religious Attendance and Mental Health Results Summary

For the Mental Health Composite Score (MCS), frequency of religious attendance was not significant for the simple model, in the presence of the sociodemographic control variables previously mentioned. In the presence of interactions with race/ethnicity and education, however, attendance was significantly associated with mental health (refer to Table A.3). For race/ethnicity, African Americans had better mental health with increasing frequency of attendance, whereas Caucasians and others showed the opposite trend (refer to Figure A.7). For those with some high school or college/graduate school education, mental health scores did not vary across attendance levels. Respondents with less than a high school education, however, showed differences in mental health scores with varying frequency of attendance. Those with less than a high school education reported much lower mental health scores when attending once per week compared with those with more education, while showing higher mental health scores at attendance of more than once per week and one to three times per month than those with higher education (refer to Figure A.8). The model was run in the presence of sociodemographic controls for gender, race, marital status, and number of children living in the household. None of these controls was significant except for females and those with low income, which had a negative association with mental health (refer to Table A.3).

Objective I.3 Religious Attendance and Depression Results Summary

For CES-Depression Score (CES-D), frequency of religious attendance was not significant for the simple model, in the presence of controls. In the presence of interactions with race/ethnicity and marital status, however, attendance was

significantly associated with mean depression scores (refer to Table A.4). For African Americans, more frequent attendance was associated with lower depression scores (being less depressed) than for Caucasians and others, which showed an opposite trend, similar to the model with MCS (described above). For marital status, widowed or separated respondents who attended more than once per week had much lower scores for depression than those who did not attend, compared with the never married group. However, the married group had higher mean scores for depression at frequency of attendance more than once per week compared with married who never attended (refer to Figure A.12). The model was run in the presence of sociodemographic controls for gender, race, marital status, and number of children living in the household. None of these controls was significant except for females, low work, and low income; each of these variables had a negative association with depression (refer to Table A.4).

In summary, the results indicate the following:

There was a curvilinear trend in physical health scores with increasing attendance, controlling for the sociodemographic variables of gender, race, marital status, education level, number of children living in the household, work amount, and income. The highest physical health scores occurred at moderate attendance (ANOVA $F=21.8$, $p=0.00$; refer to Table 4.10 and Figure 4.1).

For those with low socio-economic status, low education, low work amount, or low income, some attendance was related to better physical health scores compared with not attending at all (ANOVA $F=10.9$, $p=0.00$; refer to Table A.1, Figure A.4, Figure A.5 and Figure A.6).

African Americans who attended more frequently had better mental health or lower depression scores, controlling for the sociodemographic variables of gender, race, marital status, education level, number of children living in the household, work amount, and income. In contrast, Caucasians and others who attended more frequently had poorer mental health scores and higher depression scores.

For those with some high school or college/graduate school education, mental health scores did not vary across attendance levels. However, respondents with less than a high school education who attended had much better mental health scores than those of low education who did not attend at all. The cell count for those with low education was low, ranging from 8 to 15, so the results may not be reliable.

Objective 1.4 Religious Attendance and Mental Health and Depression Comparing African Americans and Caucasians and All Others Results Summary

In an attempt to better understand the interactions of race/ethnicity with religious attendance, separate regression models were run for each separate race/ethnicity for the models with the dependent health outcomes of mental health and depression. Similar to the overall models with the significant interaction of race/ethnicity and religious attendance, the separate regression models by race/ethnicity showed that African Americans who attended more frequently also reported to have better mental health and to be less depressed compared to African Americans who did not attend. The opposite trend occurred for Caucasians and all others. Caucasians and all others who attended more frequently reported to have poorer mental health and to be more depressed than Caucasians and all others who did not attend (refer to Table 4.12). Prior research has found that African Americans derive additional non-religious resources and support from religious participation, such as social, material, and civic benefits (Franzini 2005). Further research to investigate the differences in mental

health and depression outcomes needs to be conducted to help elucidate the differences among African Americans and Caucasians and others.

Study Strengths

National longitudinal data sets which include adequate variables on both religiousness, and physical health, mental health, and depression are not common; most national datasets are cross-sectional. Despite the limitations in using this secondary data set of the NLSY79, this study is one of the few that the author is aware of that investigates the association of religious attendance and physical health, mental health, and depression cross-sectionally (refer to Chapter 4) and over time (refer to Chapter 5), as well as testing the mediating theoretical pathways of behavior/lifestyle (refer to Chapter 6) by utilizing a longitudinal national dataset. The findings of this research contribute to the existing literature on the effects of religious attendance on physical health, mental health, and depression because they help to clarify the association between religious attendance and health for the 40-to-43-years age group. The present study provides evidence that different groups, such as those of low socio-economic status and African Americans, interact with religious attendance in different ways. Religious attendance may serve different purposes among different groups.

Study Limitations

The limitations of the data used in this analysis include having a small number of religious and physical and mental health variables available for a continuous number of years throughout the study. The variables are available for only a few years during the 25-year duration of the study. This makes it impossible to take full advantage of a longitudinal cohort in examining changes in religiousness and health over time within the sample. This issue will be examined in presenting Objective II.

A major limitation of this analysis is its cross-sectional nature, which does not permit the assessment of causality. However, the study contributes to the current literature by highlighting a series of interaction associations that have not been studied extensively. Finally, in presenting Objective II of this dissertation, the longitudinal nature of the data is explored to strengthen a possible causality argument.

Possible Policy Implications

The following policy implications are presented as possibilities based on the limited results of this study. Further analysis in future studies and possible intervention studies would need to be conducted before the suggested policies could be implemented.

The finding that some degree of religious participation is related to better physical health may encourage more collaboration between the healthcare system and religious organizations in seeking to improve the quality of life and physical health of individuals.

Individuals of low socio-economic status (SES) who participate in religious services appear to have better physical health than those of low SES who do not attend.

Likewise, African Americans who participate in religious services appear to have better mental health and less depression than African Americans who do not attend.

This evidence may encourage physical and mental healthcare and other social service agencies to collaborate with religious organizations to provide additional “nonreligious” resources and services for the health, material, social and civic needs of these two particular groups, those of low socio-economic status (SES) and African Americans. However, further research is needed to further determine the nature of the

relationship and effects of religious participation on physical and mental health among these two groups of low SES and African Americans.

Future Recommendations:

To build on the findings of this study, it will be important to study the effects of religious attendance in different groups separately. A combination of quantitative and qualitative research among different groups may provide insights into the nature of interactions with SES, race/ethnicity, and marital status. It would be interesting to examine different age groups to see whether similar effects are found, using different cohorts of the National Longitudinal Survey, such as the children of the mothers of the NLSY79.

CHAPTER 5 Objective II Results

Results Objective II

The Influence of Religious Attendance, Affiliation, and Change in Attendance in early Adulthood on Mental Health, Depression, and Physical Health in Later Adulthood

Overview of Chapter

This chapter presents the results of the analysis pertaining to Objective II, as explained in Chapter 3. Objective II examines the relationship of religious attendance, affiliation, and change in attendance in early adulthood to physical health, mental health, and depression in mid-adulthood.

The chapter is organized as follows. First, I describe sample characteristics. Next, I provide the results of several general linear models. The results of the association of religious attendance with physical health are described first, followed by the outcomes for mental health and, last, depression.

Sociodemographics of the Sample Population

The sociodemographic characteristics of the sample population in 1982, 1998, and 2000 included in the analysis are described below. The cohort of respondents included in the analysis was limited to individuals who were between 22 and 25 years of age in 1982, likewise 40 and over in the year 2000 (ages 40-43).

Unweighted Descriptive Statistics of the Sociodemographics of the Sample Population

The unweighted sample data were used for the following reported descriptive characteristics. Most respondents considered themselves healthy enough to work in 1981. When reporting on their health status during the year before the 1982 interview, only 4.8 percent of respondents stated that their health could limit the amount or kind of work for pay that they could do, while 95.2 percent stated that health would not interfere with their work (refer to Table 5.1). Those who stated that their health would affect their work reported most often attending religious services one to three times per month (27.7%), while those with no health limitations most commonly reported attending infrequently (32.4%).

In 1982, most respondents reported not being married (63.6%), about one-third reported being married (30%), and only 6.3 percent were divorced, widowed, or separated (refer to Table 5.1). By 1998 and 2000, most were married (about 60%), and only about 20 percent were never married, while the remaining approximate 20 percent were divorced, widowed, or separated (compare Table 5.1 with Table 4.1 and Table 5.4).

Education levels in 1982 indicate that most had some high school education or more (95.8%), and only 4.2 percent reported less than a high school education. By 1998 and 2000 the education level of some high school or more increased by only about one percent from 1982 (from 95.8% to about 96.8%; compare Table 5.4 and Table 5.1 with Table 4.1).

In 1982, most did not have children (biological, step or adopted children living in their household, 70.6%), and about one-third reported either one or more children living

with them (refer to Table 5.1). By 1998, most reported having one or more children (about two-thirds) living in their household, decreasing by about 2 percent by the year 2000 (from 68.2% to 66.8%; compare Table 4.1 to Table 5.4).

In 1982, most respondents reported working 20 or more hours per week in the previous calendar year (73.7%), and less than one-third reported working less than 20 hours per week (26.3%; refer to Table 5.1). By 1998, those working 20 or more hours per week increased by six percent (from 73.7% to 79.7%; refer to Table 5.4), and in 2000 by two percent (to 81.6%; refer to Table 4.1).

In 1982, approximately 80 percent of individuals reported a net family income for the previous year of 1981 (refer to Table 5.1). Most reported earning in the mid-50th percentile range (40.9% earned \$8,008 to \$26,980). Approximately one-fifth reported earning in the lowest 25th percentile, and one-fifth reported earning in the top 25th percentile (approximately one-fifth did not report their income; refer to Table 5.1). The percentage of respondents in each category of income percentiles reported for the 1997 and 1999 calendar years was similar to the percentage reported in each category for the year 1981 (compare Table 5.1 with Table 5.1 Table 4.1). Note that, within just a two-year period, the income ranges were actually higher in 1997 than in 1999 for the lowest 25th, mid-50th, and top 25th percentile levels. For example, the lowest 25th percentile income range in 1997 was \$0 to \$24,960, compared with \$0 to \$20,516 in 1999; the mid-50th percentile income range in 1997 was \$25,000 to \$71,100, compared with \$20,600 to \$69,800 in 1999; and the top 25th percentile income range in 1997 was \$71,136 or more, compared with \$70,000 or more in 1999. It is unclear why net family incomes within the two lowest percentiles decreased from 1997 to 1999.

Most respondents lived in the same region of the United States from 1982 to 1998 and 2000 (refer to Table 5.1, Table 5.4, and Table 4.4). Most reported living in the South (37.5%) in 1982. This increased by about two percentage points in 2000, while the region with the lowest reported level in 1982, the Northeast (18.1%), decreased by about two percentage points in 2000 (to 16.2%).

Most individuals reported living in an urban setting in 1982 (81.6%) versus a rural setting (18.4%; refer to Table 5.1). By 1998 those living in an urban area decreased by about 5 percent from 1982 (from 81.6% in 1982 to 70.4% in 1998), while those living in a rural area in 1998 increased by over ten percent from 1982 (from 18.4% in 1982 to 29.6% in 1998; compare Table 5.4 to Table 5.1). In 2000, there was a slight trend reversal from 1998, with a small increase in urban living of about 3 percent (from 70.4% in 1998 to 73.1% in 2000) and a decrease in rural living of about 5 percent (from 29.4% in 1998 to 24.9% in 2000; compare Table 4.4 to Table 5.4).

Key Independent Variable: Religious Attendance in 1982 and 2000

In 1982, 31.7 percent of individuals reported attending religious services infrequently (i.e., attending religious services less than or equal to several times a year or less; refer to Table 5.1). For each of the demographic characteristics of 1982, the respondents indicated that the level of “infrequent” attendance in 1982 was most commonly reported, except for the following characteristics, those with less than a “about once per week” (26.7 %) (during middle adulthood, ages 40-43; refer to Table 4.1).

Some of the regression models used in Objective II also controlled for 1998 sociodemographic characteristics, in addition to 1982 sociodemographic characteristics. The 1998 sociodemographic characteristics were very similar to the

2000 characteristics listed in the previous chapter in the descriptives section for Objective I (compare Table 4.1 and Table 5.4).

Weighted Descriptive Statistics of the 1982 Sociodemographics of the Sample Population

The 1982 sociodemographic independent variable descriptives were weighted using the 2000 sample weight. The year 2000 sample weight was used for the descriptive statistics of the 1982 sociodemographic variables because the sample for the study was selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

The 2000 sample weight provides descriptions of the noninstitutionalized people born between 1957 through 1960, living in the United States in 1978, from which the study sample of those who turned aged 40 and over in 2000 is representative (CHRR 2004; S. McClaskie, personal communication, Fall 2005). As previously described in Chapter 4, the 2000 sample weight adjusted mainly for over-sampling of minorities, particularly Hispanics and African Americans. It accounted for loss to follow-up after the year 1979 in which the survey was administered. The weight also adjusted for two groups which were over-sampled, military and economically disadvantaged Caucasians. These groups were later dropped from the study in 1985 and 1991, respectively. The sample weight did not account for the sample design effect of clustering. This limitation would not affect the frequencies and percentages of the weighted descriptive statistics but would only provide overly precise standard errors, for example.

There were few differences, except for race/ethnicity, in comparison of the percentages of the unweighted (refer to Table 5.1) and weighted (refer to Table 5.2 and Table 5.3) descriptive statistics of the 1982 sociodemographic variables. The

weighted descriptive statistics showed that there fewer minorities of Hispanics (6.7%) and African Americans (13.8%) and more Caucasians and all others (79.5%) in the United States (for those born between 1957 and 1960 who were noninstitutionalized and living in the United States in 1978), which this study sample represented in 1982, compared to the study sample unweighted descriptives. The unweighted descriptives had much higher frequencies and percentages of minorities, Hispanics (18.6%), African Americans (30.4%), and fewer Caucasians and all others (51.0%) because of the oversampling of minorities. Oversampling of minorities was used to ensure the study sample had adequate numbers of minorities for future statistics analyses. All other percentage differences in each of the sociodemographic variables for the weighted and unweighted descriptive statistics were within a plus or minus 5 % difference (compare Table 5.1 to Table 5.2 and Table 5.3). The size of the United States noninstitutionalized population for people living in the United States in 1978 born between 1957 and 1960 which this study sample is representative of for the variable of religious attendance was 9.0 million people in 1982 (refer to Table 5.3). The United States population which the sample size represented in 2000 was 9.3 million people for the variable of religious attendance. The difference in population sizes for the survey years 1982 and 2000 occurred because more people happened to answer the religious attendance question in 2000 than in 1982.

Weighted Descriptive Statistics of the Sociodemographics of the Sample Population 1998

The 1998 unweighted descriptive statistics were weighted using the year 2000 sample weight. There were few differences in the unweighted compared to the weighted descriptives statistics for the study year 1998 (compared Table 5.4 to Table 5.5 and Table 5.6). All the sociodemographic independent variables were within a plus or minus 5 percent difference. The only difference greater than 5% occurred for the

marital status level of married and living residence of urban or rural. Respondents in the study who reported being married in 1998 were 58.4% (refer to Table 5.4), while the weighted descriptive statistics showed 65.9% (refer to Table 5.5 and Table 5.6) were married. Likewise, respondents who reported living in a rural (29.6%; refer to Table 5.4) or urban (70.4%) residence in the study differed from the weighted descriptive statistics by 5.6%. The weighted descriptives showed that 35.2% lived in a rural residence and 64.8% lived in an urban residence (refer to Table 5.5 and Table 5.6). The size of the United States noninstitutionalized population of which this study sample is representative was approximately 9.3 million people in 1998 who were living in the United States in 1978 and born between the years 1957 to 1960 (refer to Table 5.3).

Table 5.1 SocioDemographic Descriptives 1982 by Religious Attendance 1982 (Unweighted).

Independent Variables 1982	Religious Attendance 1982										Variable Row Total	
	>1/wk		About 1/wk		About 1-3/mth		<=Sev./yr (Infrequent)		Not at all			
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Health Could Limit Work Limit or Kind 1981												
Yes	9	9.6	14	14.9	26	27.7	23	24.5	22	23.4	94	4.8%
No	119	6.4	272	14.6	425	22.8	604	32.4	445	23.9	1865	95.2%
Gender												
Female	91	8.6	175	16.6	252	23.9	327	31.1	208	19.8	1053	51.8%
Male	44	4.5	121	12.3	214	21.8	318	32.4	283	28.9	980	48.2%
Race/Ethnicity												
Hispanic	33	8.7	66	17.4	77	20.3	121	31.9	82	21.6	379	18.6%
African American	38	6.1	88	14.2	180	29.1	174	28.2	138	22.3	618	30.4%
Caucasian and all others	64	6.2	142	13.7	209	20.2	350	33.8	271	26.2	1036	51.0%
Marital												
Divorced/Widowed/Separated	9	7.0	14	10.9	20	15.5	50	38.8	36	27.9	129	6.3%
Married	43	7.0	103	16.9	141	23.1	194	31.8	129	21.1	610	30.0%
Never married	83	6.4	179	13.8	304	23.5	401	31.0	326	25.2	1293	63.6%
Education												
>= High School	131	6.7	277	14.3	450	23.2	628	32.4	455	23.4	1941	95.8%
<High School	4	4.7	18	21.2	16	18.8	14	16.5	33	38.8	85	4.2%
Child #												
>=2 Children	21	8.6	33	13.5	53	21.7	83	34.0	54	22.1	244	12.0%
1 Child	21	5.9	48	13.6	90	25.4	115	32.5	80	22.6	354	17.4%
0 Children	93	6.5	215	15.0	323	22.5	447	31.1	357	24.9	1435	70.6%
Work Amt 1981												
Full-Time (FT) > 20 hrs/wk	87	5.8	218	14.7	354	23.8	472	31.7	357	24.0	1488	73.7%
Part-Time (PT) 0 to 20 hrs/wk	46	8.6	76	14.3	110	20.7	168	31.6	132	24.8	532	26.3%
Income Net Family 1981												
Missing	23	6.6	51	14.7	90	25.9	97	28.0	86	24.8	347	17.1%
Top 25% (\$27,000- 75,001)	26	6.1	52	12.2	94	22.1	134	31.5	120	28.2	426	21.0%
Mid 50% (\$8,008 – 26,980)	57	6.9	123	14.8	204	24.5	243	29.2	204	24.5	831	40.9%
Lowest 25% (\$0-8,000)	29	6.8	70	16.3	78	18.2	171	39.9	81	18.9	429	21.1%

Table 5.1 (Continued).

Independent Variables 1982		Religious Attendance 1982										Variable Row Total	
		>1/wk		About 1/wk		About 1-3/mth		<=Sev./yr (Infrequent)		Not at all			
		#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Region	West	21	5.3	58	14.8	73	18.6	121	30.8	120	30.5	393	19.4%
	South	68	9.0	106	14.0	219	28.9	211	27.8	154	20.3	758	37.5%
	North Central	33	6.5	84	16.6	110	21.8	171	33.9	107	21.2	505	25.0%
	Northeast	13	3.6	47	12.8	60	16.4	137	37.4	109	29.8	366	18.1%
Residence	Rural	25	7.0	56	15.8	67	18.9	108	30.4	99	27.9	355	18.4%
	Urban	108	6.9	229	14.5	364	23.1	499	31.7	375	23.8	1575	81.6%
Religious Attendance Total		135	6.6	296.0	14.6	466.0	22.9	645.0	31.7	491.0	24.2	2033	100.0%

Table 5.2 SocioDemographic Descriptives 1982 by Religious Attendance 1982 Weighted (2000 sample weight divided by mean sample weight to obtain original sample size of approximately 2102 in order to directly compare frequency and percentage of each variable with the unweighted descriptive statistics).^{a, b}

Independent Variables 1982	Religious Attendance 1982										Variable Row Total	
	>1/wk		About 1/wk		About 1-3/mth		<=Sev./yr (Infrequent)		Not at all			
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Health Could Limit Work Limit or Kind 1981 Yes	11	12.1	16	16.8	21	22.5	23	25.3	22	23.3	93	4.7
No	114	6.1	254	13.4	393	20.8	639	33.9	486	25.8	1886	95.3
Gender Female	80	8.1	160	16.1	222	22.4	315	31.8	214	21.6	991	48.6
Male	49	4.7	119	11.4	203	19.4	361	34.4	315	30.1	1047	51.4
Race/Ethnicity Hispanic	12	8.7	23	16.7	24	18.0	45	32.9	32	23.7	136	6.7
African American	17	6.1	39	13.9	78	27.8	81	28.9	66	23.3	281	13.8
Caucasian and all others	100	6.2	217	13.4	323	19.9	550	33.9	431	26.6	1620	79.5
Marital Divorced/Widowed/Separated	7	6.2	13	11.3	16	14.0	43	37.7	35	30.9	114	5.6
Married	41	6.2	106	16.2	144	21.9	207	31.6	158	24.1	656	32.2
Never married	81	6.4	160	12.6	265	20.9	426	33.6	335	26.5	1267	62.2
Education >= High School	127	6.4	269	13.6	418	21.2	669	33.9	489	24.8	1972	97.1
<High School	3	4.5	9	14.6	7	11.7	5	7.7	36	61.5	58	2.9
Child # >=2 Children	15	7.8	31	15.7	40	20.4	65	32.9	46	23.3	196	9.6
1 Child	20	6.3	44	13.8	74	23.2	95	29.8	86	27.0	318	15.6
0 Children	94	6.2	204	13.4	312	20.5	517	33.9	397	26.1	1524	74.8
Work Amt 1981 Full-Time (FT) > 20 hrs/wk	79	5.1	215	13.9	342	22.0	511	33.0	404	26.0	1552	76.7
Part-Time (PT) 0 to 20 hrs/wk	46	9.8	62	13.1	81	17.3	158	33.6	124	26.3	471	23.3

Table 5.2 (Continued).

Independent Variables 1982	Religious Attendance 1982										Variable Row Total	
	>1/wk		About 1/wk		About 1-3/mth		<=Sev./yr (Infrequent)		Not at all			
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Income Net Family 1981												
Missing	17	5.5	46	14.6	72	23.1	89	28.4	89	28.9	314	15.4
Top 25% (\$27,000- 75,001)	25	6.7	44	11.8	71	19.1	122	32.9	109	29.4	370	18.2
Mid 50% (\$8,008 – 26,980)	54	6.5	113	13.4	193	22.9	258	30.7	223	26.5	841	41.3
Lowest 25% (\$0-8,000)	33	6.4	76	14.9	89	17.4	207	40.3	108	21.0	513	25.2
West	18	5.2	39	11.0	56	16.0	112	31.8	126	35.9	352	17.3
South	64	9.4	92	13.5	178	26.2	189	27.8	156	23.0	677	33.4
North Central	38	6.3	99	16.3	129	21.3	210	34.5	132	21.6	608	30.0
Northeast	9	2.3	48	12.3	59	15.1	161	41.1	115	29.2	392	19.3
Rural	26	6.2	65	15.7	70	17.1	131	31.9	119	29.0	410	21.0
Urban	103	6.7	206	13.3	333	21.6	510	33.0	393	25.4	1545	79.0
Religious Attendance Total	129	6.3	279	13.7	425	20.9	676	33.2	529	25.9	2038	100.0

^a The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

^b The year 2000 sample weight is used for the descriptive statistics of the 1982 sociodemographic variables because the sample for the study is selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

Table 5.3 SocioDemographic Descriptives 1982 by Religious Attendance 1982 Weighted (2000 sample weight used to obtain descriptive statistics of the noninstitutionalized U.S. population living in the U.S. in 1978 who were born between 1957 and 1964 and turned 40 and over in the year 2000).^{a, b}

Independent Variables 1982		Religious Attendance 1982										Variable Row Total	
		>1/wk		About 1/wk		About 1-3/mth		<=Sev./yr (Infrequent)		Not at all			
		#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Health Could Limit Work Limit or Kind 1981	Yes	49930	12.1	69059	16.8	92618	22.5	104073	25.3	95764	23.3	411444	4.7
	No	506338	6.1	1125076	13.4	1742520	20.8	2834952	33.9	2156624	25.8	8365510	95.3
Gender	Female	355809	8.1	707723	16.1	983992	22.4	1399125	31.8	947812	21.6	4394462	48.6
	Male	218279	4.7	528089	11.4	902630	19.4	1600086	34.4	1397528	30.1	4646611	51.4
Race/Ethnicity	Hispanic	52643	8.7	101125	16.7	108480	18.0	198644	32.9	143371	23.7	604263	6.7
	African American	75652	6.1	173291	13.9	346725	27.8	360938	28.9	291304	23.3	1247910	13.8
	Caucasian and all others	445793	6.2	961396	13.4	1431416	19.9	2439629	33.9	1910665	26.6	7188899	79.5
Marital	Divorced/Widowed/Separated	31362	6.2	57112	11.3	70734	14.0	191053	37.7	156387	30.9	506647	5.6
	Married	181232	6.2	470340	16.2	637621	21.9	920397	31.6	701154	24.1	2910745	32.2
	Never married	361494	6.4	708360	12.6	1177237	20.9	1887762	33.6	1487799	26.5	5622652	62.2
Education	>= High School	562362	6.4	1191850	13.6	1856385	21.2	2967812	33.9	2168627	24.8	8747037	97.1
	<High School	11725	4.5	37828	14.6	30236	11.7	19976	7.7	159593	61.5	259358	2.9
Child #	>=2 Children	67656	7.8	136903	15.7	177679	20.4	286621	32.9	202731	23.3	871590	9.6
	1 Child	88095	6.3	195057	13.8	326370	23.2	419664	29.8	380327	27.0	1409513	15.6
	0 Children	418337	6.2	903852	13.4	1382572	20.5	2292927	33.9	1762282	26.1	6759970	74.8
Work Amt 1981	Full-Time (FT) > 20 hrs/wk	352210	5.1	955111	13.9	1517383	22.0	2269127	33.0	1791719	26.0	6885550	76.7
	Part-Time (PT) 0 to 20 hrs/wk	204066	9.8	274018	13.1	360761	17.3	700641	33.6	548095	26.3	2087582	23.3

Table 5.3 (Continued).

Independent Variables 1982	Religious Attendance 1982										Variable Row Total	
	>1/wk		About 1/wk		About 1-3/mth		<=Sev./yr (Infrequent)		Not at all			
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Income Net Family 1981												
Missing	77079	5.5	203367	14.6	320849	23.1	395143	28.4	395231	28.4	1391669	15.4
Top 25% (\$27,000- 75,001)	110686	6.7	194634	11.8	314247	19.1	540230	32.9	482976	29.4	1642774	18.2
Mid 50% (\$8,008 – 26,980)	241411	6.5	499871	13.4	855586	22.9	1146245	30.7	989351	26.5	3732464	41.3
Lowest 25% (\$0-8,000)	144911	6.4	337940	14.9	395940	17.4	917593	40.3	477782	21.0	2274166	25.2
Region												
West	81965	5.2	172408	11.0	250583	16.0	495919	31.8	560752	35.9	1561626	17.3
South	282797	9.4	406565	13.5	788595	26.2	836826	27.8	690409	23.0	3005192	33.4
North Central	169240	6.3	441225	16.3	574045	21.3	930786	34.5	583857	21.6	2699152	30.0
Northeast	40086	2.3	214442	12.3	262938	15.1	715415	41.1	508342	29.2	1741223	19.3
Residence												
Rural	113199	6.2	286224	15.7	310954	17.1	580193	31.9	527398	29.0	1817967	21.0
Urban	456015	6.7	913077	13.3	1476978	21.6	2262860	33.0	1743626	25.4	6852556	79.0
Religious Attendance Total	574088	6.3	1235812	13.7	1886621	20.9	2999211	33.2	2345340	25.9	9041073	100.0

^a The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

^b The year 2000 sample weight is used for the descriptive statistics of the 1982 sociodemographic variables because the sample for the study is selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

Table 5.4 Descriptives of 1998 Sociodemographics (Unweighted).

Independent Sociodemographic Variables 1998		Table Total	
		#	Row %
Marital Status	<i>Widowed/Separated /Divorce</i>	416	21.2%
	<i>Married</i>	1145	58.4%
	<i>Never married</i>	398	20.3%
Education	<i>>=High School</i>	1897	96.8%
	<i>< High School</i>	62	3.2%
Children living in household	<i>>=2 children</i>	988	50.4%
	<i>1 child</i>	349	17.8%
	<i>0 children</i>	622	31.8%
Work Amt. 1997	<i>Full-time (>20 hrs/wk)</i>	1549	79.7%
	<i>Part-time (0-20 hrs/wk)</i>	394	20.3%
Net Family Income 1997	<i>Missing</i>	519	24.7%
	<i>Top 25% (>=\$71,136)</i>	398	18.9%
	<i>Mid-50% (\$25,000 to \$71,100)</i>	795	37.8%
	<i>Lowest 25% (<=\$24,960)</i>	390	18.6%
Region	<i>West</i>	380	19.9%
	<i>South</i>	746	39.1%
	<i>North Central</i>	469	24.6%
	<i>Northeast</i>	314	16.4%
Residence	<i>Rural</i>	568	29.6%
	<i>Urban</i>	1354	70.4%
Study Sample Total		2102	100.0%

Table 5.5 Descriptives of 1998 Sociodemographics Weighted (2000 sample weight divided by mean sample weight to obtain original sample size of approximately 2102 in order to directly compare frequency and percentage of each variable with the unweighted descriptive statistics).^{a, b}

Independent Sociodemographic Variables 1998		Table Total	
		#	Row %
Marital Status	<i>Widowed/Separated /Divorce</i>	355	18.1%
	<i>Married</i>	1295	65.9%
	<i>Never married</i>	316	16.1%
Education	<i>>=High School</i>	1926	97.9%
	<i>< High School</i>	41	2.1%
Children living in household	<i>>=2 children</i>	992	50.5%
	<i>1 child</i>	356	18.1%
	<i>0 children</i>	618	31.4%
Work Amt. 1997	<i>Full-time (>20 hrs/wk)</i>	1588	81.4%
	<i>Part-time (0-20 hrs/wk)</i>	362	18.6%
Net Family Income 1997	<i>Missing</i>	467	22.2%
	<i>Top 25% (>=\$71,136)</i>	456	21.7%
	<i>Mid-50% (\$25,000 to \$71,100)</i>	862	41.0%
	<i>Lowest 25% (<=\$24,960)</i>	317	15.1%
Region	<i>West</i>	342	17.8%
	<i>South</i>	682	35.4%
	<i>North Central</i>	557	29.0%
	<i>Northeast</i>	343	17.8%
Residence	<i>Rural</i>	680	35.2%
	<i>Urban</i>	1253	64.8%
Study Sample Total		2102	100.0%

^a The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

^b The year 2000 sample weight is used for the descriptive statistics of the 1998 sociodemographic variables because the sample for the study is selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

Table 5.6 Descriptives of 1998 Sociodemographics Weighted (2000 sample weight used to obtain descriptive statistics of the noninstitutionalized U.S. population living in the U.S. in 1978 who were born between 1957 and 1964 and turned 40 and over in the year 2000).^{a, b}

Independent Sociodemographic Variables 1998		Table Total	
		#	Row %
Marital Status	<i>Widowed/Separated /Divorce</i>	1575902	18.1%
	<i>Married</i>	5745051	65.9%
	<i>Never married</i>	1402719	16.1%
Education	<i>>=High School</i>	8543597	97.9%
	<i>< High School</i>	180075	2.1%
Children living in household	<i>>=2 children</i>	4401216	50.5%
	<i>1 child</i>	1580602	18.1%
	<i>0 children</i>	2741855	31.4%
Work Amt. 1997	<i>Full-time (>20 hrs/wk)</i>	7045035	81.4%
	<i>Part-time (0-20 hrs/wk)</i>	1607783	18.6%
Net Family Income 1997	<i>Missing</i>	2072594	22.2%
	<i>Top 25% (>=\$71,136)</i>	2022731	21.7%
	<i>Mid-50% (\$25,000 to \$71,100)</i>	3824995	41.0%
	<i>Lowest 25% (<=\$24,960)</i>	1405078	15.1%
Region	<i>West</i>	1517603	17.8%
	<i>South</i>	3023914	35.4%
	<i>North Central</i>	2471912	29.0%
	<i>Northeast</i>	1522840	17.8%
Residence	<i>Rural</i>	3018050	35.2%
	<i>Urban</i>	5558459	64.8%
US population of which Study Sample is Representative		9311040	100.0%

^a The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

^b The year 2000 sample weight is used for the descriptive statistics of the 1998 sociodemographic variables because the sample for the study is selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

Other Control Variables included in the analysisReligious Affiliation 1982 compared with 2000

Religious affiliation between 1982 and 2000 remained fairly constant, with a slight decrease of 1 to 4 percentage points in each denomination (compare Table 5.7 with Table 4.4). More than half were Protestant in both 1982 and 2000 (53.1% and 54.4% respectively), about one third were Catholic (32% in 1982 and 28.1% in 2000), and about one tenth reported no affiliation (10.9% in 1982 and 10.4% in 2000). The only increase among affiliations occurred within the overall category of “Other” (from 1.8% in 1982 to 7.4% in 2000 (compare Table 5.7 with Table 4.4).

The highest attendance rate reported in 1982 across most religious affiliations was infrequent attendance (refer to Table 5.7). Exceptions were found in the Protestant denomination of Baptist, with most common attendance at about once to three times per month (30.8%); affiliation reported as “Other,” with most common attendance of more than once per week (25.8%); and no affiliation, with most common attendance in 1982 of not at all (68.3%).

By 2000, the attendance rate increased to about once per week for most affiliations (except for Baptist and Episcopalian/Presbyterian (grouped together), who attended most frequently, about one to three times per month in 2000).

The other exception in attendance among affiliations in 1982 was that among those who reported no religious affiliation, most commonly reported attending religious services not at all (68.3%). This is in contrast to the 2000 reported attendance levels among those with no religious affiliation. Those who reported no affiliation in the calendar year 2000, curiously reported attending most often (70.5%) among the

possible attendance levels. This provides evidence of possible misclassification bias for the attendance level “not at all” for those with no religious affiliation.

For the entire sample of the NSLY79, approximately 96 percent of all respondents were raised in some religion, while 89 percent had a religious affiliation in 1979 and 1982. Religious service attendance appeared to have increased with the aging of the cohort. For example, the frequency of religious attendance for the category of more than once a week more than doubled for the cohort, from 9.4 percent in 1979 to 20.1 percent in 2000 (CHRR, 2004). A similar trend was found among the sub-cohort of the 2000 health module; attendance at more than once per week increased over threefold from 6.6 percent in 1982 to 20.7 percent in 2000 (compare Table 5.7 with Table 4.4). The most frequent attendance level also increased, from infrequent in 1982 (31.7%) to about once per week in 2000 (26.7%).

Weighted Descriptive Statistics for Religious Affiliation 1982

The 1982 unweighted descriptive statistics of religious affiliation were weighted using the year 2000 sample weight. There were few differences in the unweighted compared to the weighted descriptive statistics for the various religious affiliations, within a plus or minus 5 percent difference (compare Table 5.7 to Table 5.8 and Table 5.9). The only difference greater than 5 % occurred for the religious affiliation of Baptists. Respondents in the study who reported being affiliated as a Baptist in 1982 were 51.9% (refer to Table 5.7), while the weighted descriptive statistics show 11.1% fewer were actually Baptists, 40.8% (refer to Table 5.8 and Table 5.9).

Table 5.7 Religious Affiliation by Religious Attendance in 1982 (Unweighted).

Religious Affiliation 1982	Religious Attendance 1982										Variable Row Total	
	>1/wk		About 1/wk		About 1- 3/mth		<= Several times/yr (Infrequent)		Not at all			
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Religious Affiliation Protestant Total	105	9.5%	157	14.2%	310	28.0%	337	30.4%	198	17.9%	1107	54.4%
<i>Baptist</i>	45	7.8%	80	13.9%	177	30.8%	165	28.7%	107	18.6%	574	51.9%
<i>Methodist</i>	3	2.3%	16	12.4%	40	31.0%	44	34.1%	26	20.2%	129	11.7%
<i>Lutheran</i>	3	3.1%	8	8.2%	31	32.0%	38	39.2%	17	17.5%	97	8.8%
<i>Presbyterian</i>	0	0.0%	2	4.4%	15	33.3%	16	35.6%	12	26.7%	45	4.1%
<i>Episcopalian</i>	1	4.0%	2	8.0%	3	12.0%	14	56.0%	5	20.0%	25	2.3%
<i>Other</i>	48	25.8%	42	22.6%	36	19.4%	38	20.4%	22	11.8%	186	16.8%
<i>No Denomination</i>	5	9.8%	7	13.7%	8	15.7%	22	43.1%	9	17.6%	51	4.6%
Religious Affiliation Other than Protestant	18	2.8%	132	20.2%	138	21.1%	233	35.7%	132	20.2%	653	32.1%
Roman Catholic												
Jewish	1	5.6%	2	11.1%	1	5.6%	11	61.1%	3	16.7%	18	0.9%
Other	9	25.0%	4	11.1%	2	5.6%	13	36.1%	8	22.2%	36	1.8%
None	2	0.9%	1	0.5%	15	6.9%	51	23.4%	149	68.3%	218	10.7%
Religious Attendance Total	135	6.6%	296	14.6%	466	22.9%	645	31.7%	491	24.2%	2033	100.0%

Table 5.8 Religious Affiliation by Religious Attendance in 1982 Weighted (2000 sample weight divided by mean sample weight to obtain original sample size of approximately 2102 in order to directly compare frequency and percentage of each variable with the unweighted descriptive statistics).^{a, b}

Religious Affiliation 1982	Religious Attendance 1982										Variable Row Total	
	>1/wk		About 1/wk		About 1- 3/mth		<= Several times/yr (Infrequent)		Not at all			
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Religious Affiliation Protestant Total	97	8.9	142	12.9	283	25.7	360	32.8	216	19.7	1098	53.9
<i>Baptist</i>	37	8.3	57	12.7	126	28.1	123	27.5	105	23.4	448	40.8
<i>Methodist</i>	4	2.5	14	9.0	48	30.4	59	37.4	32	20.7	157	14.3
<i>Lutheran</i>	3	2.1	12	8.4	45	32.5	58	41.5	22	15.5	139	12.7
<i>Presbyterian</i>	0	0.0	3	5.4	17	28.3	25	40.7	16	25.6	62	5.6
<i>Episcopalian</i>	1	1.4	3	8.5	5	12.9	22	55.9	8	21.3	39	3.5
<i>Other</i>	48	26.1	44	24.1	30	16.5	41	22.3	20	11.0	183	16.7
<i>No Denomination</i>	5	6.7	9	12.5	11	15.4	33	46.7	13	18.7	70	6.4
Religious Affiliation Other than Protestant	14	2.3	130	20.4	127	19.9	227	35.6	139	21.9	638	31.3
Roman Catholic												
Jewish	2	7.4	4	13.5	2	5.7	15	54.2	5	19.2	28	1.4
Other	15	30.9	2	4.0	3	6.4	18	37.6	10	21.2	47	2.3
None	1	0.4	1	0.3	11	5.1	56	24.8	156	69.4	225	11.0
Religious Attendance Total	129	6.3	279	13.7	425	20.9	676	33.2	529	25.9	2038	100.0

^a The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

^b The year 2000 sample weight is used for the descriptive statistics of the 1998 sociodemographic variables because the sample for the study is selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

Table 5.9 Religious Affiliation by Religious Attendance in 1982 Weighted (2000 sample weight used to obtain descriptive statistics of the noninstitutionalized U.S. population living in the U.S. in 1978 who were born between 1957 and 1964 and turned 40 and over in the year 2000).^{a, b}

Religious Affiliation 1982	Religious Attendance 1982										Variable Row Total	
	>1/wk		About 1/wk		About 1-3/mth		<= Several times/yr (Infrequent)		Not at all			
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Religious Affiliation Protestant Total	431670	8.9	630340	12.9	1253669	25.7	1598327	32.8	959068	19.7	4873072	53.9
<i>Baptist</i>	165670	8.3	251623	12.7	559133	28.1	546833	27.5	464926	23.4	1988186	40.8
<i>Methodist</i>	17753	2.5	62586	9.0	211806	30.4	260941	37.4	143991	20.7	697077	14.3
<i>Lutheran</i>	13156	2.1	51890	8.4	200714	32.5	256803	41.5	95937	15.5	618501	12.7
<i>Presbyterian</i>	0	0.0	14676	5.4	77581	28.3	111338	40.7	70106	25.6	273701	5.6
<i>Episcopalian</i>	2344	1.4	14482	8.5	22041	12.9	95671	55.9	36485	21.3	171022	3.5
<i>Other</i>	212022	26.1	196085	24.1	134546	16.5	181508	22.3	89286	11.0	813447	16.7
<i>No Denomination</i>	20724	6.7	38997	12.5	47847	15.4	145233	46.7	58337	18.7	311138	6.4

Table 5.9 (Continued).

Religious Affiliation 1982	Religious Attendance 1982										Variable Row Total	
	>1/wk		About 1/wk		About 1-3/mth		<= Several times/yr (Infrequent)		Not at all			
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %
Religious Affiliation Other than Protestant	64120	2.3	576821	20.4	561803	19.9	1007355	35.6	618809	21.9	2828908	31.3
Roman Catholic	9182	7.4	16821	13.5	7134	5.7	67610	54.2	23922	19.2	124669	1.4
Jewish	65001	30.9	8454	4.0	13465	6.4	79057	37.6	44541	21.2	210518	2.3
Other	4115	.4	3376	.3	50551	5.1	246862	24.8	691352	69.4	996257	11.0
None	574088	6.3	1235812	13.7	1886621	20.9	2999211	33.2	2345340	25.9	9041073	100.0
U.S. Population of which Study Sample is Representative for Religious Attendance												

^a The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups that were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

^b The year 2000 sample weight is used for the descriptive statistics of the 1998 sociodemographic variables because the sample for the study is selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

Change in Religious Attendance 1982 to 2000

A variable was created to account for changes in religious attendance from 1982 to 2000. Seven levels were created to account for such changes between 1982 and 2000, based on the same five attendance levels for each period. The five levels of attendance were: (1) more than once per week, (2) about once per week, (3) about one to three times per month, (4) less than or equal to several times per year, and (6) not at all. For the change in attendance variable, the seven levels include: (1) high increase in attendance, with a difference in attendance levels from 1982 to 2000 of +3 to +4; (2) low increase in attendance, with a difference in attendance levels from 1982 to 2000 of +1 to +2; (3) no change in high attendance from 1982 to 2000, with the attendance level remaining at more than once per week to once per week; (4) no change in moderate attendance from 1982 to 2000, with the attendance level remaining at one to three times per month; (5) no change in low attendance from 1982 to 2000, with the attendance level remaining at infrequent to not at all; (6) low decrease in attendance from 1982 to 2000, with a difference in attendance levels from 1982 to 2000 of -1 or -2; and last, (7) high decrease in attendance, with a difference in the attendance levels from 1982 to 2000 of -3 to -4.

Among the seven levels of this variable of change in attendance, according to a one-way Analysis of Variance ([ANOVA]; without controlling for other factors), the level which had the highest health score for physical and mental health and lowest depression score was within the level of no change in moderate attendance (attending one to three times per month), from 1982 to 2000: PCS (52.7), MCS (53.6), CES-Depression (3.1; refer to Table 5.10). The same lowest depression score also occurred at high decrease in attendance (refer to Table 5.10). The poorest health scores were reported for PCS at the level of high increase in attendance from 1982 to 2000 (51.2),

for MCS at the level of “no change in high attendance from 1982 to 2000” (51.3), and for CES-Depression at the level of “high increase in attendance” from 1982 to 2000, (4.0; refer to Table 5.10, Figure 5.1, Figure 5.2, and Figure 5.3 respectively).

Correlation and Multicollinearity

Possible correlations and collinearity problems were checked for with respect to the 1982 and 1998 socio-demographic variables. Only the variables of education 1982 and 1998 and region 1982 and 1998 were found to be multicollinear. The education 1998 and region 1998 variables were excluded from the Objective II models. The religious attendance and affiliation 1982 variables were also slightly multicollinear. Thus attendance and affiliation were each run in separate models to observe their relationship with the health outcome variables. Change in religious attendance from 1982 to 2000 was found to be multicollinear and correlated with both attendance and affiliation 1982. Thus change in attendance was also run in separate models in Objective II, in order to observe its relationship with the dependent health variables, without the presence of attendance or affiliation.

Table 5.10 Descriptives and One Way ANOVA of Independent Variable Change in Religious Attendance 1982 to 2000 by Dependent Health Variables 2000 PCS, MCS and C-ESD.

Religious Attendance Change 1982 to 2000	Statistic	Dependent Health Variable		
		PCS	MCS	CES D
High Increase (difference in attendance level from 1982 to 2000 is +3 or +4)	#	458	458	460
	%	22.7%	22.7%	22.7%
	Mean	51.2	52.0	4.0
	SE	.4	0.4	0.2
Low Increase (difference in attendance level from 1982 to 2000 is +1 or +2)	#	686	686	690
	%	34.0%	34.0%	34.1%
	Mean	51.9	53.0	3.3
	SE	0.3	0.3	0.2
High No Change (attendance level from 1982 to 2000 stays the same at >1/wk or 1/wk)	#	57	57	57
	%	2.8%	2.8%	2.8%
	Mean	52.3	51.3	3.9
	SE	1.1	1.5	0.8
Moderate No Change (attendance level from 1982 to 2000 stays the same at 1-3x/mth)	#	148	148	148
	%	7.3%	7.3%	7.3%
	Mean	52.7	53.6	3.1
	SE	0.6	0.6	0.3
Low No Change (attendance level from 1982 to 2000 stays at the same at infrequent or not at all)	#	125	125	125
	%	6.2%	6.2%	6.2%
	Mean	52.3	52.5	3.5
	SE	0.7	0.8	0.4
Low Decrease (difference in attendance level from 1982 to 2000 is -1 or -2)	#	419	419	419
	%	20.8%	20.8%	20.7%
	Mean	52.4	53.0	3.3
	SE	0.4	0.4	0.2
High Decrease (difference in attendance level from 1982 to 2000 is -3 or -4)	#	124	124	125
	%	6.1%	6.1%	6.2%
	Mean	51.6	54.0	3.1
	SE	0.8	0.7	0.5
Religious Attendance Change from 1982 to 2000 Total	#	2017	2017	2024
	%	100%	100%	100%
	Mean	51.9	52.8	3.5
	SE	0.2	0.2	0.1
	F Value	1.1	1.7	1.8
	P-value	0.34	0.13	0.10
	Between Groups df	6	6	6
	Within Groups df	2010	2010	2017
	Total df	2016	2016	2023

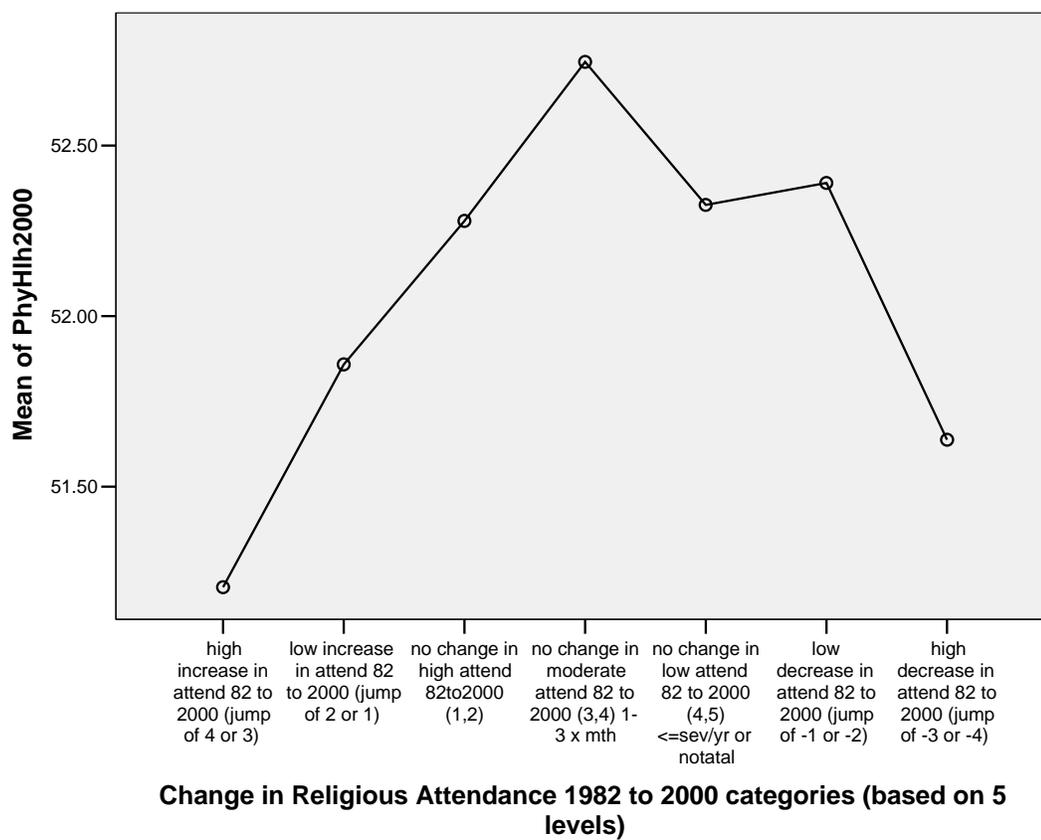


Figure 5.1 One-Way ANOVA of Physical Health Composite Score (SF-12 PCS) in 2000 by Change in Religious Attendance 1982 to 2000 without controls.

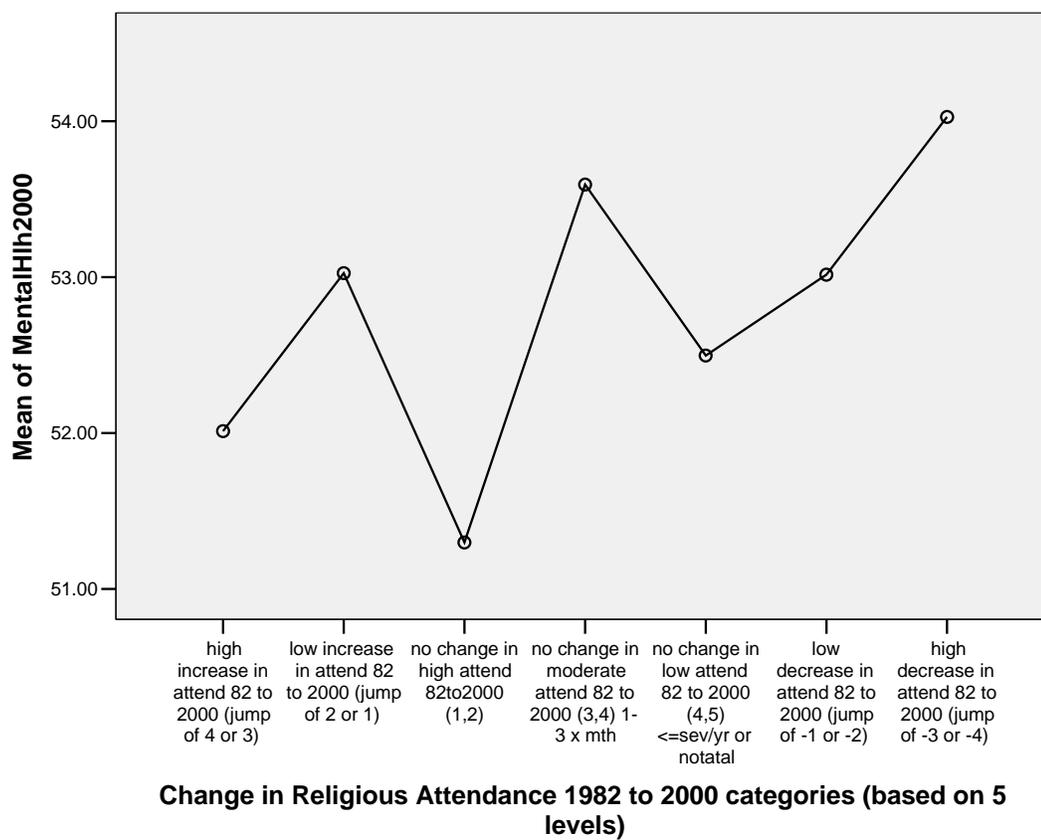


Figure 5.2 One-Way ANOVA, of Mental Health Composite Score (SF-12 MCS) in 2000 by Change in Religious Attendance 1982 to 2000 without controls.

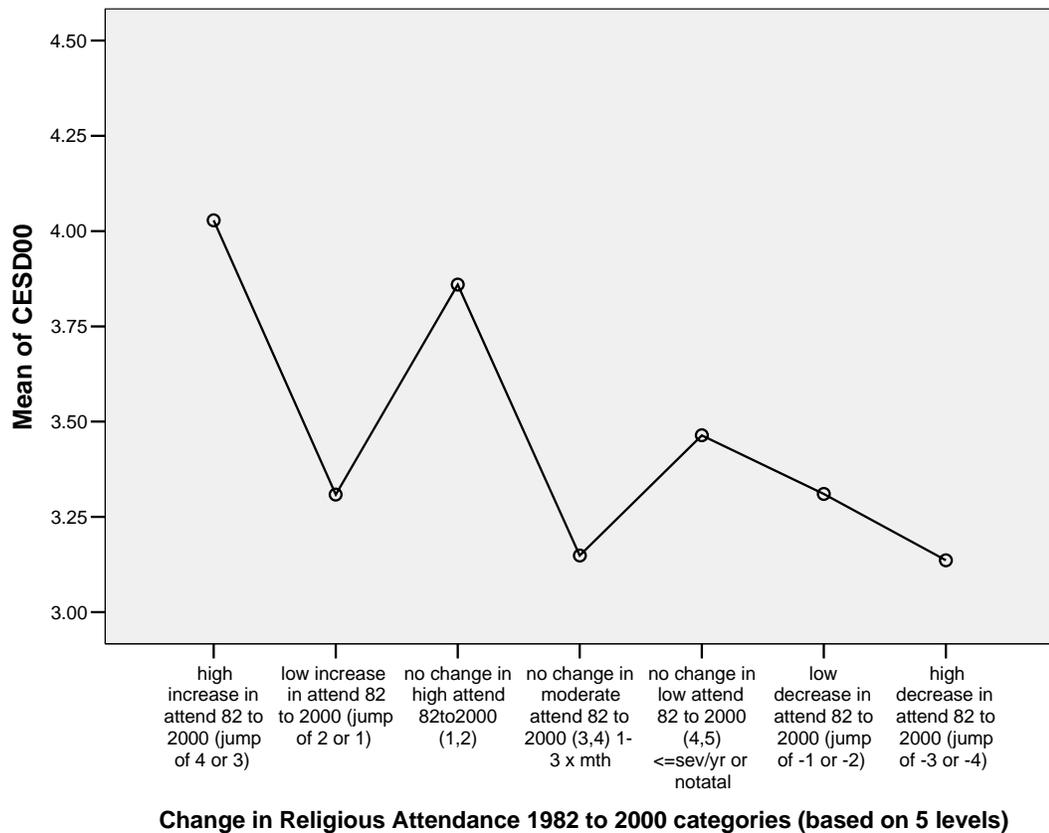


Figure 5.3 One-Way ANOVA, of CES-Depression Score (CES-D) in 2000 by Change in Religious Attendance 1982 to 2000 without controls.

Objective II Results

The Influence of Religious Attendance, Affiliation, and Change in Attendance in early Adulthood on Physical Health, Mental Health, and Depression in Later Adulthood

Objective II.1. The influence of religious attendance 1982 on physical health, mental health, and depression in 2000, controlling for 1982 sociodemographic factors.

Results for Objective II.1: The background characteristics included in this analysis are the following socioeconomic factors (measured in 1982): gender, race/ethnicity, marital status, education, number of children (living in the household with the respondent), amount of work (hours per week) in 1981, net family income in 1981, residence, and region, including baseline health limitations in 1981. Table 5.1 provides a descriptive summary of the 1982 variables included in the model by 1982 religious attendance levels. The same type of sociodemographic variables used in the model for Objective I for the year 2000 (in the previous chapter), were used in the models for Objective II, for the year 1982. These same type of sociodemographic variables were retained in all subsequent models for the year 1982, even though not all the variables were significant. Each of these variables was retained as a standard sociodemographic variable to control for in relation to health outcomes, and for comparative purposes pertaining to each model, in each objective.

The results of the general linear model analysis indicate that higher levels of attendance in early adulthood are associated with better mental health and lower depression in mid-adulthood, controlling for 1982 sociodemographic factors. Those who attended more frequently in 1982 were less likely to report a high depression index compared to those who reported attending not at all in 1982 (refer to Table 5.11 and Table 5.12). Gender was the only sociodemographic control variable related to

mental health in 2000; males reported better mental health scores compared to females. Males were also less likely to be depressed compared to females. Other factors associated with having higher rates of depression in 2000 were having a health limitation (which could prevent a respondent from working for pay) in 1981, being African American, having one or more children in 1982, and living in the South or North Central United States in 1982 (refer to Table 5.11 and Table 5.12).

Table 5.11 Obj. II. ANOVA Simple Model of Physical Health Composite Score, (SF-12PCS), Mental Health Composite Score (SF-12 MCS), and CES-Depression Score (CES-D) in 2000 by Religious Attendance in 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Independent Variables 1982 Source	Physical Health Composite Score (SF- 12 PCS) 2000			Mental Health Composite Score (SF- 12 MCS) 2000			CES-Depression Score (CES-D) 2000		
	df	F	Sig.	df	F	Sig.	df	F	Sig.
Corrected Model	21	4.5	.00	21	2.8	.00	21	5.9	.00
Intercept	1	4699.9	.00	1	5083.5	.00	1	162.9	.00
Religious Attendance 1982	4	1.0	.39	4	2.9	.02	4	2.4	.05
Health Could Limit Amt/Kind Work 1981	1	44.7	.00	1	2.1	.14	1	16.1	.00
Gender	1	4.0	.05	1	22.4	.00	1	14.0	.00
Race/Ethnicity	2	6.3	.00	2	.4	.66	2	6.7	.00
Marital Status 1982	2	.5	.63	2	.6	.55	2	.4	.70
Education 1982	1	1.4	.24	1	.03	.86	1	.2	.66
Child # in Household 1982	2	.7	.49	2	1.7	.18	2	7.0	.00
Work Amount 1981	1	1.3	.25	1	.4	.54	1	.6	.42
Net Family Income 1981	3	.4	.76	3	.9	.42	3	.8	.48
Residence 1982	1	3.1	.08	1	.5	.48	1	.4	.54
Region 1982	3	.7	.57	3	1.1	.34	3	2.8	.04
Error	1805			1805			1811		
Total	1827			1827			1833		
Corrected Total	1826			1826			1832		
a Adj. R Squared	0.039			.020			0.053		

Table 5.12 Obj. II. Parameter Estimates of Simple Model of Physical Health Composite Score, (SF-12PCS), Mental Health Composite Score (SF-12 MCS), and CES-Depression Score (CES-D) in 2000 by Religious Attendance in 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 1982 Parameter	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	52.2	.00	49.7	54.7	54.1	.00	51.5	56.7	2.4	.00	1.11	3.72
Rel. Attend. 82 >1/wk (RA)	.9	.28	-.7	2.5	2.2	.01	.4	3.9	-1.1	.01	-1.96	-.24
RA 82 1/wk	1.2	.06	.0	2.4	1.3	.04	.0	2.6	-.6	.08	-1.22	.08
RA 82 1-3x/mth	.3	.55	-.8	1.5	1.7	.01	.5	2.8	-.7	.01	-1.31	-.14
RA 82<=Sev.x/yr (Infreq.)	.4	.47	-.6	1.4	1.4	.01	.3	2.5	-.5	.05	-1.06	.00
RA 82 Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
81 Hlh Limits Amt. or Kind of Work Yes	-5.8	.00	-7.6	-4.1	-1.3	.14	-3.1	.5	1.8	.00	.94	2.73
81 Hlh Limits Amt. or Kind of Work No	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-.8	.05	-1.6	.0	-2.0	.00	-2.9	-1.2	.8	.00	.38	1.21
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	-1.4	.01	-2.5	-.3	.1	.81	-1.0	1.3	.4	.22	-.22	.95
African American	-1.5	.00	-2.5	-.6	-.4	.44	-1.4	.6	.9	.00	.43	1.43
Caucasian and others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Marital Status: Div./Wid./Sep.	-.6	.45	-2.3	1.0	-.4	.69	-2.1	1.4	-.2	.61	-1.09	.64
Married	.2	.74	-.9	1.2	-.6	.27	-1.7	.5	-.2	.43	-.77	.33
Never Married	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Education Level: >=High School 82	1.2	.24	-.8	3.2	.2	.86	-1.9	2.3	-.2	.66	-1.26	.80
< High School 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
>=2 Children 82	-.9	.23	-2.3	.5	-1.3	.09	-2.7	.2	1.3	.00	.59	2.06
1 Child 82	-.3	.65	-1.4	.9	.0	.98	-1.2	1.2	.8	.01	.17	1.40
No Children 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time	.6	.25	-.4	1.5	-.3	.54	-1.3	.7	-.2	.42	-.70	.29
Work Part-Time	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table 5.12 (Continued).

Independent Variables 1982 Parameter	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Income 82 Missing	-.6	.33	-1.8	.6	-.9	.17	-2.2	.4	.4	.23	-.25	1.03
Income 82 Top 25%	-.4	.52	-1.6	.8	-1.0	.14	-2.3	.3	.5	.15	-.17	1.11
Income 82 Mid 50%	-.1	.78	-1.2	.9	-.6	.27	-1.7	.5	.3	.24	-.21	.85
Income 82 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence 82 Urban	-.9	.08	-1.9	.1	.4	.48	-.7	1.4	-.2	.54	-.69	.36
Residence 82 Rural	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region 82: West	-.7	.25	-2.0	.5	-.3	.66	-1.6	1.0	.5	.13	-.15	1.17
South 82	.0	.97	-1.1	1.1	-.7	.27	-1.8	.5	.9	.00	.28	1.46
North Central 82	-.4	.53	-1.5	.8	.3	.65	-.9	1.5	.6	.07	-.04	1.17
Northeast 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

^a This parameter is set to zero because it is redundant.

A positive trend was observed in the association between attendance during young adulthood to self-reported physical health in mid-adulthood, controlling for the same 1982 background factors included in the analysis of mental health and depression. However, the difference between the different attendance levels was not significant (refer to Table 5.11 and Table 5.12). The sociodemographic control variables in young adulthood that were related to having poorer physical health in later adulthood included having a health limitation in 1981; being female, African American or Hispanic; and living in a rural residence.

In order to control for the influence of later sociodemographic variables in 1998 on health in 2000, the following 1998 sociodemographic variables were added to the model: marital status, number of children (living in the household with the respondent), amount of work (hours per week) in 1997, net family income in 1997, and residence. The 1998 variables of education and region were excluded from the

model, because they were found to be multicollinear with the 1982 variables of education and region.

The results of the general linear model analysis were similar to those observed when only 1982 controls were included in the model. Higher levels of attendance in early adulthood were associated with better mental health and lower depression in mid-adulthood, controlling for 1982 and 1998 sociodemographic factors (refer to ANOVA Table B.1, Parameter Estimate Table B.2, Figure B.2, and Figure B.3). The other factors related to better mental health in 2000 were being male and working twenty or more hours per week in 1997. The factors related to lower levels of depression in 2000 were: not having a health limitation in 1981, being male, having no children (living with the respondent) in 1982, living in the Northeast region of the United States in 1982, being married in 1998, working twenty or more hours in 1997, and having an income in the range of the middle 50th to the top 25th percentile in 1997 (refer to ANOVA Table B.1, and Parameter Estimate Table B.2).

Similar to the simple model controlling for 1982 sociodemographic variables only, including both 1982 and 1998 control variables, a positive trend was also observed for the association between early attendance and later physical health; however, the association was not significant overall. Other factors that were related to better physical health were not having a health limitation in 1981, being Caucasian, married in 1998, and working twenty or more hours per week in 1997 (refer to ANOVA Table B.1, Parameter Estimate Table B.2, and Figure B.1).

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

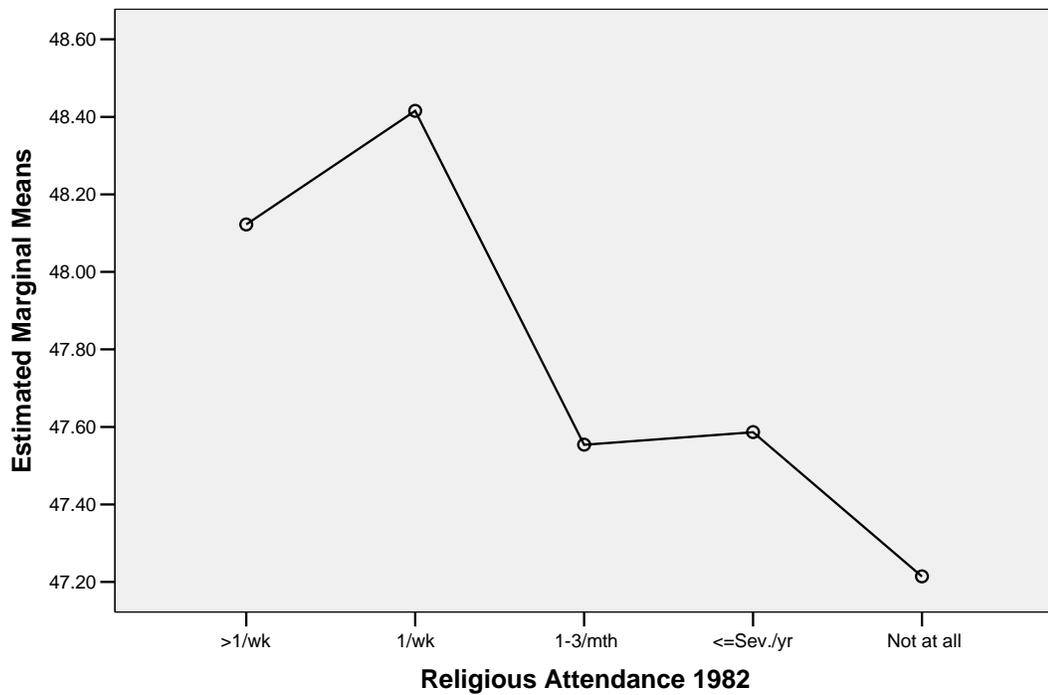


Figure 5.4 Obj. II. Simple Model of Physical Health Composite Score (SF-12 PCS) 2000 by Religious Attendance 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

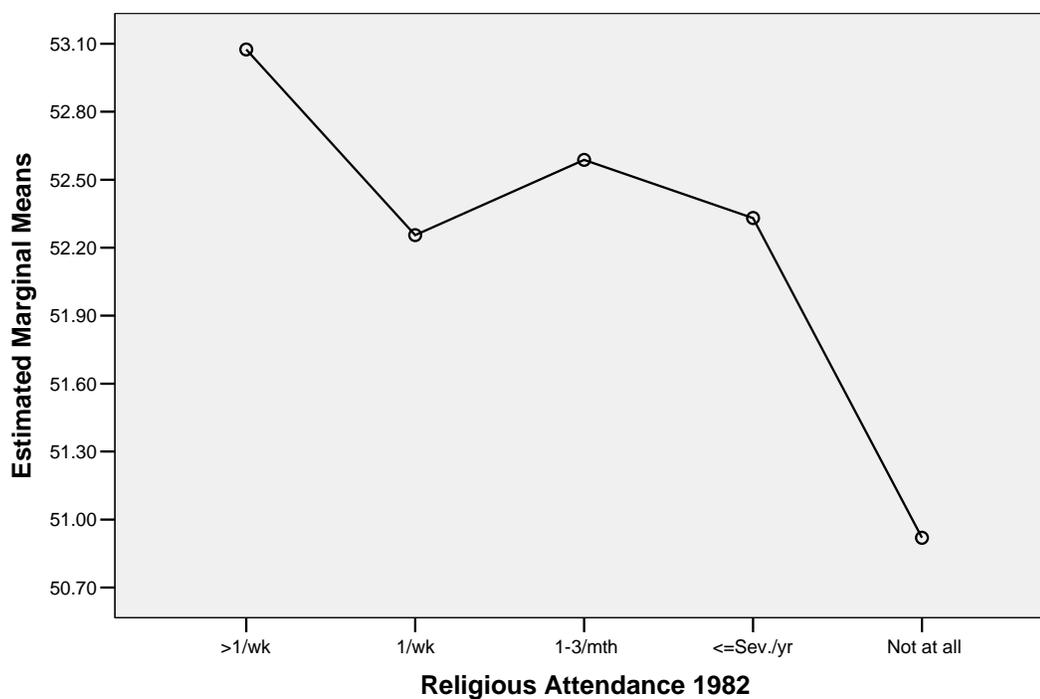


Figure 5.5 Obj. II. Simple Model of Mental Health Composite Score (SF-12 MCS) 2000 by Religious Attendance 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

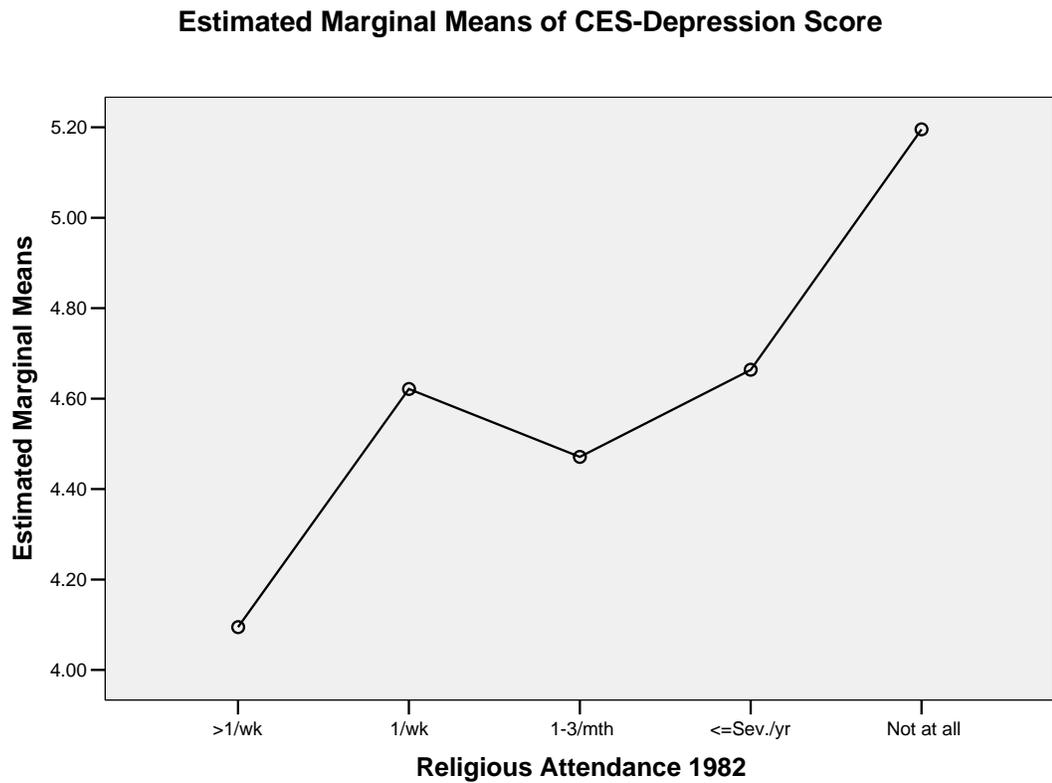


Figure 5.6 Obj. II. Simple Model of CES-Depression Score (CES-Depression) 2000 by Religious Attendance 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Results for Objective II.1

The above-mentioned regression models for the outcome variables of physical health, mental health, and depression were run without the baseline control variable of “health problems which could limit the amount or kind of work one could do in 1981.” The regression models were run without this health limitations control variable because as an independent type of health variable it may be measuring the same concept as one of the dependent health outcome variables. In addition, because it is a very significant independent control variable, it is important to determine whether it is driving the significant relationship between the independent variable of religious attendance and the dependent variables of physical health and depression (refer to Table 5.12).

The variable was created from the two survey questions “(Are you/would you be) limited in the kind of work you (could) do on a job for pay because of your health?” as well as the question “(Are you/would you be) limited in the amount of work you (could) do because of your health?” with possible responses of “yes” or “no” (NLS, 2004).

This health limitation variable was significant in the simple regression models for the dependent health variables of physical health ($B = -5.8$, $p = 0.00$) and depression ($B = 1.8$, $p = 0.00$), but not for mental health ($B = -1.3$, $p = 0.14$; refer to Table 5.12).

This significant variable of health limitations may subsume some of the explained variance in physical health and depression contributed by the other independent sociodemographic control variables. Without the presence of the health limitation control variable, less overall variance in physical health and depression was explained by the models, evidenced by smaller adjusted R squares, reduced by almost half for

the health outcome variables of physical health (reduced adjusted $R^2 = 0.039$ to 0.021) and depression (reduced adjusted $R^2 = 0.053$ to 0.025 ; compare Table 5.11 and Table 5.13). In the presence of the independent variable of health limitations, the adjusted R square is still low, evidence that this independent variable of health limitations is not measuring the same concept as the dependent variable of physical health or depression. Therefore, this provides some justification for keeping the independent control variable of health limitations in the models.

In addition, in the absence of the health limitation control variable, some of the remaining sociodemographic variables increased in significance, particularly for some of the levels of religious attendance (compare Table 5.12 to Table 5.13). Religious attendance was significant with and without the independent variable of health limitations for the models with the dependent variables of physical health and depression (compare Table 5.12 to Table 5.13). Therefore, this is evidence that the variable of health limitations was not driving the significant relationship between the independent variable of religious attendance and the dependent variables of physical health and depression.

Other previously nonsignificant variables (in the presence of the variable of health limitations; refer to Table 5.12) became significant in the absence of the variable of health limitations in the models for physical health and depression. For example, for the physical health model, in the absence of the control variable of health limitations, the sociodemographic variable of education beyond high school, having no children living in the household with the respondent, and working 20 or more hours per week became significantly associated with higher (better) physical health scores (compare Table 5.12 to Table 5.13). Also, physical health and mental health scores were higher

and depression scores lower across the religious attendance levels without the presence of the health limitations control variable; compare Figure 5.4, Figure 5.5, Figure 5.6, with Figure 5.7, Figure 5.8 and Figure 5.9).

Table 5.13 Obj. II. Parameter Estimates of Simple Model of Physical Health Composite Score, (SF-12 PCS), Mental Health Composite Score (SF-12 MCS), and CES-Depression Score (CES-D) 2000 by Religious Attendance 1982 (excluding baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 1982 Parameter	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	50.9	.00	48.4	53.4	54.0	.00	51.4	56.6	2.7	.00	1.4	4.0
Rel. Attend.1982 >1/wk (RA)	.5	.57	-1.2	2.1	2.2	.01	.5	3.9	-1.1	.01	-1.9	-2
RA 1982 1/wk	1.5	.02	.2	2.7	1.2	.08	-.1	2.5	-.5	.12	-1.2	.1
RA 1982 1-3x/mth	.4	.48	-.7	1.5	1.7	.00	.6	2.9	-.8	.01	-1.4	-2
RA1982<=Sev.x/y r (Infreq.)	.6	.25	-.4	1.6	1.5	.01	.4	2.5	-.7	.02	-1.2	-1
RA 1982 Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-.9	.02	-1.7	-.1	-2.2	.00	-3.0	-1.3	.9	.00	.5	1.3
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	-1.3	.02	-2.4	-.2	.0	.95	-1.1	1.2	.4	.13	-.1	1.0
African American	-1.6	.00	-2.6	-.6	-.7	.19	-1.7	.3	1.0	.00	.5	1.5
Caucasian and all others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Marital Status 1982:Div/Wid/Sep	-.5	.52	-2.2	1.1	-1.0	.27	-2.7	.8	-.2	.68	-1.0	.7
Married 1982	.2	.68	-.8	1.3	-.5	.37	-1.6	.6	-.3	.34	-.8	.3
Never Married 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Education Level: >=High School 1982	2.1	.04	.1	4.0	.1	.94	-1.9	2.1	-.4	.47	-1.4	.6
< High School 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
>=2 Children 82	-1.2	.09	-2.6	.2	-1.4	.06	-2.8	.1	1.4	.00	.7	2.1
1 Child 1982	-.2	.74	-1.4	1.0	.0	.99	-1.2	1.2	.8	.01	.2	1.5
No Children 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time 81	.8	.10	-.2	1.7	-.2	.70	-1.2	.8	-.3	.27	-.8	.2
Work Part-Time 81	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table 5.13 (Continued).

Independent Variables 1982 Parameter	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95 %	B	Sig.	CI	95 %
Income 1981 Missing	-.8	.19	-2.1	.4	-.9	.17	-2.2	.4	.4	.23	-.3	1.0
Income 1981 Top 25%	-.7	.28	-1.9	.6	-.9	.17	-2.2	.4	.5	.10	-.1	1.2
Income 1981 Mid 50%	-.4	.50	-1.4	.7	-.7	.20	-1.8	.4	.4	.19	-.2	.9
Income 1981 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence 1982 Urban	-.9	.09	-1.9	.1	.2	.71	-.9	1.3	-.1	.61	-.7	.4
Residence 1982 Rural	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region 1982: West	-.7	.25	-2.0	.5	-.1	.85	-1.5	1.2	.5	.11	-.1	1.2
South 1982	.1	.83	-1.0	1.3	-.3	.64	-1.5	.9	.7	.01	.1	1.3
North Central 82	-.4	.50	-1.6	.8	.6	.37	-.7	1.8	.5	.09	-.1	1.1
Northeast 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Adj. R Square	0.021				0.025				0.025			
Corrected Model df	20				20				20			
Error df	1877				1877				1877			
Total df	1898				1898				1898			
F	3.1				3.4				3.4			
Sig.	0.00				0.00				0.00			

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

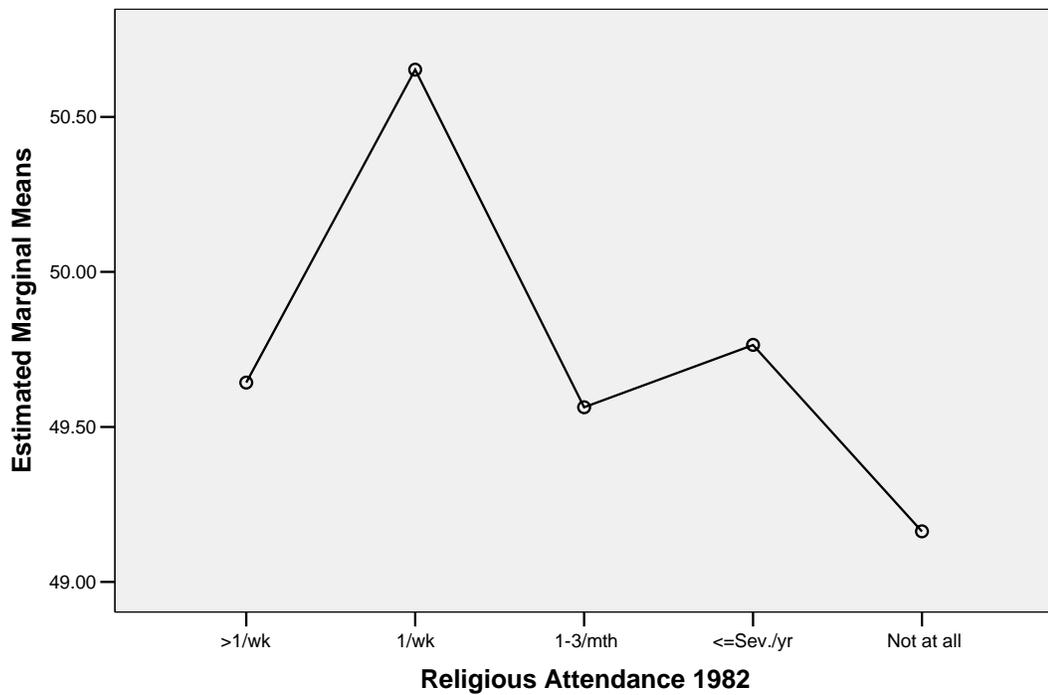


Figure 5.7 Obj. II. Simple Model of Physical Health Composite Score (SF-12 PCS) by Religious Attendance 1982 (excluding baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

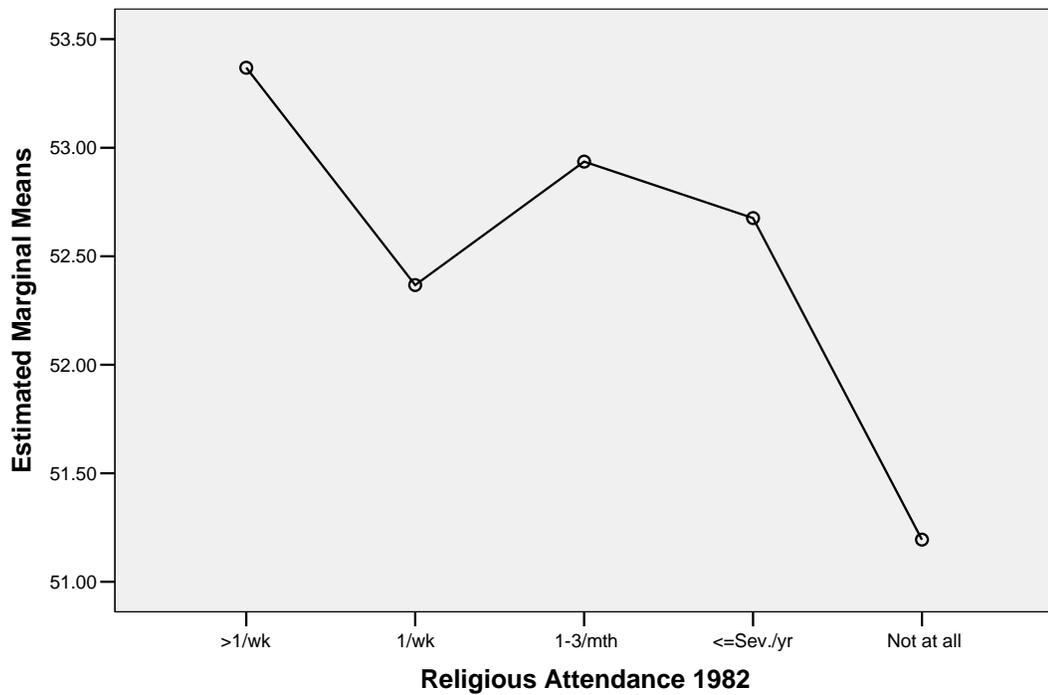


Figure 5.8 Obj. II. Simple Model of Mental Health Composite Score (SF-12 MCS) by Religious Attendance 1982 (excluding baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

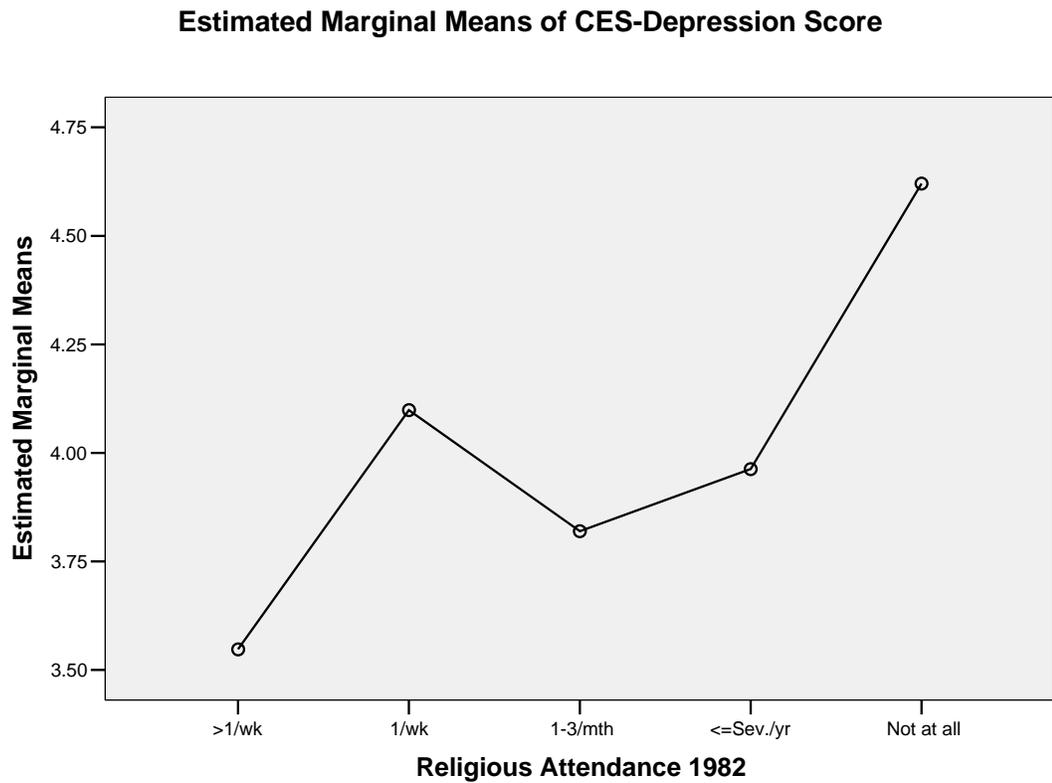


Figure 5.9 Obj. II. Simple Model of CES-Depression Score (SF-12 CES-D) by Religious Attendance 1982 (excluding baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Objective 2.2. The effect of sociodemographic 1982 modifiers on the association between religious attendance in 1982 to later physical health, mental health, and depression in 2000.

Results of Objective II.2. Ethnicity and number of children (living in the household with the respondent in 1982) modify the influence of religious attendance 1982 on mental health and depression in 2000, in models with one two-way interaction (of race/ethnicity with attendance or number of children with attendance) and in models with two two-way interactions (race/ethnicity with attendance and number of children with attendance; refer to Table B.3, Table B.4, and Table B.5). Females reported lower mental health scores than males. There were no significant factors that modified the effects of religious attendance 1982 on physical health 2000. Additional models were analyzed adding 1998 sociodemographic control variables to the above model, with very similar results in terms of significant interactions.

Mental Health: One and Two Two-Way Interactions of Race/Ethnicity and Number of Children 1982 each with Religious Attendance 1982

One Two-Way Interaction: Race/Ethnicity by Religious Attendance

Caucasians and all others with higher religious attendance (as young adults) reported better mental health and fewer depressive symptoms (as they aged into their 40s) compared with other ethnicities across all attendance levels (refer to Parameter Estimate Table B.4). However, the opposite trend was observed for the cross-sectional analysis of the relationship between religious attendance (measured in the year 2000) and mental health (measured in the year 2000) for Caucasians and all others during mid-adulthood (refer to Table A.3, Figure A.7, Figure A.9 and Table 4.11, Figure 4.6). It is unclear why these conflicting results of religious attendance on mental health for Caucasians and all others exist. Further study, perhaps from a life course or

development perspective, is needed to investigate these conflicting or changing relationships over time between religious attendance and mental health for Caucasians and all others.

African Americans show greater fluctuation in later mental health scores across early adulthood attendance levels, with low mental health scores at moderate attendance and better mental health scores at infrequent attendance, compared with Caucasians and Hispanics (refer to Figure B.4).

These results hold for the model with the two two-way interactions, in the presence of the interaction of number of children living in the household with the respondent in 1982 with attendance (refer to Figure B.6). In the presence of the one-way and two two-way interactions, the only sociodemographic variable that was significant in the model for mental health was gender.

One Two-Way Interaction: Number of Children by Religious Attendance

Those with no children who attended most frequently in 1982 (more than once per week) reported better mental health, and fewer depressive symptoms compared with those living with children (refer to ANOVA Table B.3, PE Table B.4, and Figure B.5). For those living with two or more children, mental health and depression scores fluctuated with varying attendance, with the highest mental health scores at infrequent attendance. For each of the levels within the variable of number of children living in the household, the poorest mental health scores occurred at the level of no attendance. These results hold for the model with the two two-way interactions, in the presence of the interaction of ethnicity by attendance (refer to Figure B.7).

For those living with two or more children, mental health and depression scores fluctuated with varying attendance, with the highest mental health scores at infrequent attendance. Again, whether they fell into the category of having any children or the category of not having children, those at the level of no attendance reported the poorest mental health scores.

These results held for the model with the two two-way interaction, in the presence of the interaction of ethnicity by attendance (refer to Figure B.7).

Depression: One and Two Two-Way Interactions of Race/Ethnicity and Children Number 1982 each with Religious Attendance 1982

One Two-Way Interaction: Race/Ethnicity by Attendance

For depression, Caucasians reported the lowest (best) depression scores, with the lowest among those who reported more frequent attendance. African Americans reported the highest (poorest) depression scores, with higher scores at higher attendance levels, and the lowest score at infrequent attendance. Hispanics reported higher (poorer) depression scores than Caucasians, but lower than African Americans, and their depression scores remained fairly constant across attendance levels, compared with those of Caucasians and African Americans (refer to ANOVA Table B.5, Parameter Estimate Table B.6, Figure B.8 and Figure B.10). The sociodemographic variables from 1982 that were also related to lower depression scores were having no health limitations and being male. Those living in the South and North Central regions of the U.S. in 1982 reported higher depression scores in 2000.

These results held for the model with the two two-way interactions, in the presence of the interaction of child number 1982 by attendance (refer to Table B.5, Table B.6 and Figure B.10). In the presence of the two-way interactions, the 1982 sociodemographic

variables that were associated with less depression were being male, and having no health limitations to work, in 1981. The 1982 sociodemographic variables which were related to high depression scores were living in the regions of the South and North Central United States, and having an income in the top 25th percentile.

One Two-Way Interaction: Children by Attendance

Living with no children in young adulthood and higher attendance levels in young adulthood were related to lower depression scores in mid-adulthood (refer to Table B.6, Figure B.9). Overall, those living with one or more children in 1982 had higher depression scores in 2000 across all attendance levels compared with those with no children. Those living with two or more children in 1982 had fluctuating depression scores across attendance levels, while for those living with no children in 1982, depression in 2000 scores remained constant across attendance levels. These results held for the model with the two two-way interaction, in the presence of the interaction of race/ethnicity by attendance (refer to Table B.5, Table B.6 and Figure B.11).

Objective II.3. The influence of religious affiliation in 1982 on physical health, mental health, and depression in 2000, without the presence of religious attendance in 1982, and including 1982 sociodemographic factors.

Results for Objective II.3: Religious affiliation in young adulthood was associated with mid-adulthood physical health and depression, without the presence of attendance in 1982, and controlling for 1982 sociodemographic variables (refer to Table 5.14, Table 5.15, Figure 5.10, and Figure 5.12). Those who were affiliated with the Jewish faith as young adults reported the highest physical health and lowest depression scores in mid-adulthood. There were only approximately twenty respondents who reported affiliation with the Jewish faith, so the results may not be reliable. The relationship

between affiliation and mental health showed similar trends but was not significant (refer to Figure 5.11). Those with no affiliation in young adulthood reported the poorest physical health and highest depression scores in mid-adulthood.

In the presence of religious attendance in the model, religious affiliation was significantly related only to physical health. Likewise, in the presence of religious affiliation, religious attendance frequency in young adulthood still showed a positive influence on mental health and depression in mid-adulthood, similar to the trend showed in the simple model of attendance (although religious affiliation was not significant; described in Objective II.1).

A test for multicollinearity between attendance 1982 and affiliation 1982 showed very mild multicollinearity (Condition Index 7, Correlation 2). In subsequent analyses, affiliation was dropped from the models.

Table 5.14 Obj. II. ANOVA of Simple Model of Physical Health Composite Score, (SF-12PCS), Mental Health Composite Score (SF-12 MCS), and CES-Depression Score (CES-D) 2000 by Religious Affiliation 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Independent Variables 1982 Source	Physical Health Composite Score (SF- 12 PCS) 2000			Mental Health Composite Score (SF- 12 MCS) 2000			CES-Depression Score (CES-D) 2000		
	Df	F	Sig.	df	F	Sig.	df	F	Sig.
Corrected Model	21	4.9	.00	21	2.5	.00	21	5.8	.00
Intercept	1	3435.5	.00	1	3568.5	.00	1	107.9	.00
Religious Affiliation 1982	4	3.2	.01	4	1.5	.20	4	2.1	.08
Health Could Limit Amt/Kind Work 1981	1	45.9	.00	1	2.0	.16	1	15.7	.00
Gender	1	3.7	.06	1	19.4	.00	1	11.9	.00
Race/Ethnicity	2	4.9	.01	2	.3	.73	2	5.5	.00
Marital 1982	2	.5	.61	2	.5	.59	2	.5	.64
Education 1982	1	1.1	.29	1	.1	.78	1	.2	.62
Child # in Household 1982	2	.9	.41	2	1.7	.19	2	7.4	.00
Work Amount 1982	1	1.3	.26	1	.4	.53	1	.6	.44
Net Family Income 1981	3	.4	.76	3	1.1	.35	3	.9	.45
Residence 1982	1	2.4	.12	1	.4	.54	1	.3	.56
Region 1982	3	.4	.74	3	1.1	.36	3	2.1	.10
Error	1804			1804			1810		
Total	1826			1826			1832		
Corrected Total	1825			1825			1831		
a Adj. R Squared	0.043			0.017			.052		

Table 5.15 Obj. II. Parameter Estimates of Simple Model of Physical Health Composite Score, (SF-12PCS), Mental Health Composite Score (SF-12 MCS), and CES-Depression Score (CES-D) 2000 by Religious Affiliation 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Independent Variables 1982 Parameter	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	50.9	.00	48.22	53.57	53.7	.00	50.9	56.5	2.7	.00	1.3	4.1
Protestant 1982	1.9	.00	.63	3.12	1.4	.03	.1	2.8	-.7	.03	-1.4	-.1
Roman Catholic 1982	1.7	.02	.32	3.08	1.2	.09	-.2	2.7	-.6	.11	-1.3	.1
Jewish 1982	4.7	.02	.73	8.61	3.1	.14	-1.1	7.3	-2.5	.02	-4.5	-.4
Other 1982	3.3	.03	.25	6.30	.3	.88	-2.9	3.4	-.5	.55	-2.1	1.1
None 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
1981 Hlh Limits Work Yes	-5.9	.00	-7.62	-4.20	-1.3	.16	-3.1	.5	1.8	.00	.9	2.7
1981 Hlh Limits Work No	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-.8	.06	-1.56	.02	-1.9	.00	-2.7	-1.0	.7	.00	.3	1.1
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	-1.3	.04	-2.46	-.08	.3	.66	-1.0	1.5	.3	.41	-.4	.9
African American	-1.4	.01	-2.33	-.37	-.3	.57	-1.3	.7	.9	.00	.4	1.4
Caucasian and others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Marital Status: Div./Wid./Sep 82	-.6	.51	-2.21	1.10	-.4	.68	-2.1	1.4	-.2	.60	-1.1	.6
Married 1982	.3	.60	-.76	1.32	-.6	.31	-1.7	.5	-.3	.36	-.8	.3
Never Married 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Education Level: >=High School 82	1.1	.29	-.90	3.06	.3	.78	-1.8	2.4	-.3	.62	-1.3	.8
< High School 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
>=2 Children 82	-1.0	.18	-2.35	.44	-1.3	.09	-2.8	.2	1.3	.00	.6	2.1
1 Child 82	-.4	.52	-1.55	.78	-.1	.92	-1.3	1.2	.8	.01	.2	1.4
No Children 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time 81	.5	.26	-.40	1.49	-.3	.53	-1.3	.7	-.2	.44	-.7	.3
Work Part-Time 81	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income 81 Missing	-.6	.31	-1.84	.59	-1.0	.15	-2.2	.3	.4	.23	-.2	1.0
Income 81 Top 25%	-.4	.55	-1.58	.84	-1.1	.10	-2.3	.2	.5	.13	-.1	1.1
Income 81 Mid 50%	-.2	.75	-1.17	.84	-.7	.23	-1.7	.4	.3	.22	-.2	.9
Income 81 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table 5.15. (Continued).

Independent Variables 1982 Parameter	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Residence 82 Urban	-.8	.12	-1.81	.21	.3	.54	-.7	1.4	-.2	.56	-.7	.4
Residence 1982 Rural	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region 82: West	-.6	.37	-1.86	.69	-.2	.81	-1.5	1.2	.4	.21	-.2	1.1
South 1982	.0	.98	-1.12	1.15	-.5	.44	-1.7	.7	.8	.01	.2	1.4
North Central 82	-.2	.71	-1.39	.94	.5	.44	-.7	1.7	.4	.16	-.2	1.1
Northeast 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

^a This parameter is set to zero because it is redundant.

Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS) 2000

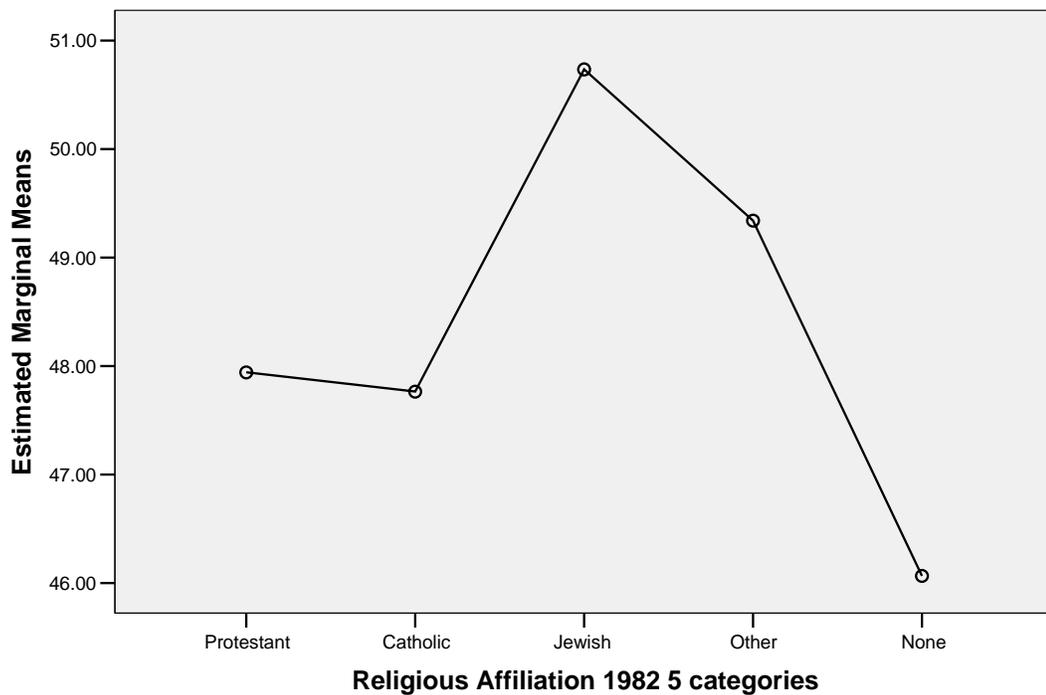


Figure 5.10 Obj. II. Simple Model of Physical Health Composite Score (SF-12PCS) 2000 by Religious Affiliation 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

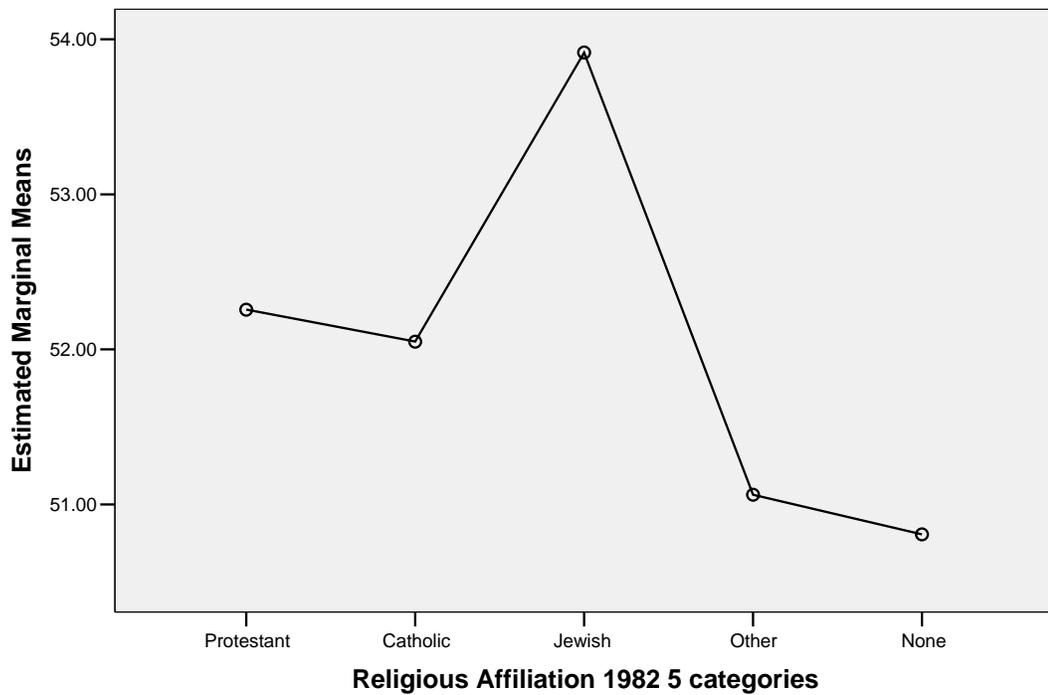


Figure 5.11 Obj. II. Simple Model of Mental Health Composite Score (SF-12 MCS) 2000 by Religious Affiliation 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

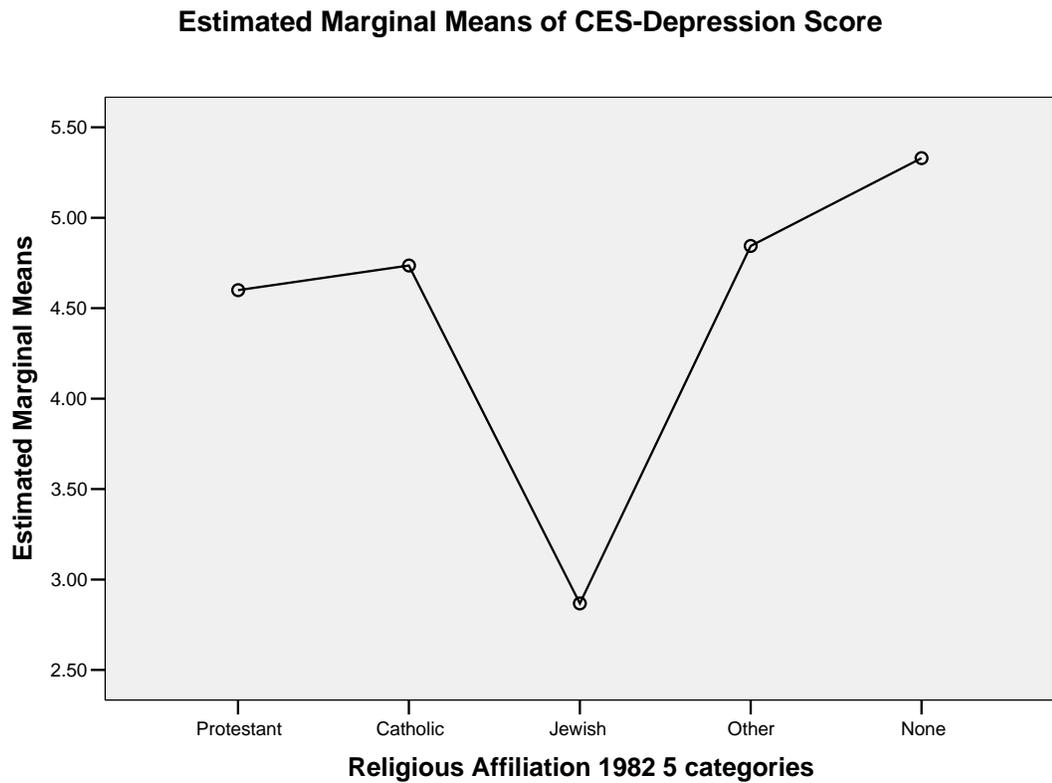


Figure 5.12 Obj. II. Simple Model of CES-Depression Score (CES-D) 2000 by Religious Affiliation 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Objective II.4. The influence of change in religious attendance from 1982 to 2000 on physical health, mental health, and depression in 2000, controlling for 1982 sociodemographic factors.

Results for Objective II.4: No change in moderate attendance of one to three times per month from 1982 to 2000 was associated with better physical health and mental health scores and with the lowest depression scores in mid-adulthood. The general trend was that no change or constant attendance (ranging from more than once per week to infrequent attendance) from 1982 to 2000 was associated with better health in 2000, compared with those who change in attendance, with the exception of those who decreased in attendance, who also reported better health.

Physical Health

The relationship between change in religious attendance from 1982 to 2000 and physical health was overall significant (refer to ANOVA Table 5.16). However, the various categories were not significantly different from the baseline (refer to Parameter Estimate Table 5.17). The overall trend was that those with no change in attendance from 1982 to 2000 reported better physical health scores in 2000, with the highest score at no change in high attendance (>1/wk to 1/wk). Those with changes in attendance over time had poorer physical health scores (refer to Figure 5.13). Other factors related to poorer physical scores were having a health limitation in 1981, being female, African American or Hispanic, and rural residence in 1982.

Mental Health

The relationship between change in religious attendance from 1982 to 2000 and mental health was overall significant (refer to ANOVA Table 5.16). Figure 5.14 shows that the best mental health scores occurred for those who had no change in moderate

attendance from 1982 to 2000 as well as those with a high decrease in attendance over time. Those with the lowest reported scores were either associated with a high increase in attendance over time or with no change in high attendance over time. Other factors related to poorer mental health scores were having a health limitation in 1981 and being female.

Depression

The relationship between change in religious attendance from 1982 to 2000 and depression was overall significant (refer to ANOVA Table 5.16). Figure 5.15 shows the lowest depression scores in 2000 for those with no change in moderate attendance. Low depression scores were also reported for those with a decrease in attendance over time. The highest depression score was found among those with the highest increase in attendance from 1982 to 2000 (refer to Table 5.17).

The other factors related to lower levels of depression in 2000 included not having a health limitation in 1981, being male, and no children (living with respondent) in 1982. Higher depression scores were associated with being African American, and living in the South and North Central region of the United States.

Addition of 1998 Sociodemographic Control Variables, with the 1982

Sociodemographic Control Variables to the Model

In addition to the sociodemographic 1982 variables, 1998 sociodemographic variables (listed in Table 5.4) were added to the above model, as controls. Similar associations were found between change in religious attendance 1982 and each health outcome in 2000 controlling for 1982 sociodemographic factors only compared to controlling for both 1982 and 1998 sociodemographic factors.

Table 5.16 Obj. II. ANOVA of Simple Model Simple Model of Physical Health Composite Score, (SF-12PCS), Mental Health Composite Score (SF-12 MCS), and CES-Depression Score (CES-D) 2000 by Change in Religious Attendance from 1982 to 2000 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Independent Variables 1982 Source	Physical Health Composite Score (SF-12 PCS) 2000			Mental Health Composite Score (SF-12 MCS) 2000			CES-Depression Score (CES-D) 2000		
	df	F	Sig.	df	F	Sig.	df	F	Sig.
Corrected Model	23	4.5	.00	23	3.0	.00	23	6.3	.00
Intercept	1	4627.5	.00	1	4957.6	.00	1	159.6	.00
Change in Religious Attendance 1982 to 2000	6	2.2	.04	6	3.5	.00	6	5.0	.00
Health Could Limit Amt/Kind Work 1981	1	46.4	.00	1	2.8	.09	1	17.5	.00
Gender	1	5.2	.02	1	23.5	.00	1	16.8	.00
Race/Ethnicity	2	7.4	.00	2	.8	.47	2	8.8	.00
Marital 1982	2	.4	.67	2	.6	.54	2	.3	.77
Education 1982	1	1.3	.26	1	.0	.91	1	.1	.75
Child # in Household 1982	2	.7	.49	2	1.5	.23	2	6.4	.00
Work Amount 1982	1	1.1	.30	1	.4	.52	1	.5	.46
Net Family Income 1981	3	.4	.78	3	1.0	.41	3	.7	.55
Residence 1982	1	3.0	.09	1	.5	.48	1	.4	.53
Region 1982	3	.6	.59	3	1.3	.27	3	3.4	.02
Error	1802			1802			1808		
Total	1826			1826			1832		
Corrected Total	1825			1825			1831		
a Adj. R Squared	0.043			0.024			0.062		

Table 5.17 Obj. II. Parameter Estimates of Simple Model Simple Model of Physical Health Composite Score, (SF-12PCS), Mental Health Composite Score (SF-12 MCS), and CES-Depression Score (CES-D) 2000 by Change in Religious Attendance (RA) from 1982 to 2000 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Independent Variables 1982 Parameter	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95 %	B	Sig	CI	95 %
Intercept	53.0	.00	50.1	55.8	56.8	.00	53.8	59.8	1.2	.12	-.3	2.7
Rel. Attend (RA) 1982 to 2000 High Increase	-.9	.27	-2.6	.7	-2.8	.00	-4.6	-1.0	1.5	.00	.6	2.3
Rel Attend 1982 to 2000 Low Increase	-.3	.75	-1.9	1.4	-1.3	.14	-3.0	.4	.5	.21	-.3	1.4
Rel Attend 1982 to 2000 No Change in High Attendance	1.1	.43	-1.6	3.7	-3.0	.04	-5.7	-2	1.0	.15	-.4	2.4
RA 1982 to 2000 No Change in Moderate Attendance	.6	.54	-1.4	2.6	-.1	.96	-2.2	2.1	-.1	.92	-1.1	1.0
RA 1982 to 2000 No Change in Low Attendance	.9	.42	-1.3	3.0	-1.1	.32	-3.4	1.1	.3	.61	-.8	1.4
RA 1982 to 2000 Low Decrease in Attendance	.9	.28	-.7	2.6	-.7	.44	-2.5	1.1	.0	1.00	-.9	.9
RA 1982 to 2000 High Decrease in Attendance	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
81 Hlh Limits Work Yes	-6.0	.00	-7.7	-4.3	-1.5	.09	-3.4	.3	1.9	.00	1.0	2.8
81 Hlh Limits Work No	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-.9	.02	-1.7	-.1	-2.1	.00	-2.9	-1.2	.9	.00	.5	1.3
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	-1.6	.01	-2.7	-.4	.1	.91	-1.1	1.2	.5	.12	-.1	1.0
African American	-1.7	.00	-2.6	-.7	-.6	.26	-1.6	.4	1.1	.00	.6	1.6
Caucasian and others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Marital Status: Div./Wid./Sep.1982	-.6	.45	-2.3	1.0	-.4	.67	-2.1	1.4	-.2	.64	-1.1	.7
Married 1982	.1	.81	-.9	1.2	-.6	.27	-1.7	.5	-.2	.51	-.7	.4
Never Married 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Education Level: >=High School 82	1.1	.26	-.9	3.1	.1	.91	-2.0	2.2	-.2	.75	-1.2	.9
< High School 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table 5.17 (Continued).

Independent Variables 1982 Parameter	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95 %	B	Sig	CI	95 %
>=2 Children 1982	-.9	.23	-2.3	.5	-1.1	.13	-2.6	.3	1.3	.00	.5	2.0
1 Child 1982	-.3	.63	-1.5	.9	.1	.89	-1.1	1.3	.8	.02	.1	1.4
No Children 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time 81	.5	.30	-.4	1.4	-.3	.52	-1.3	.7	-.2	.46	-.7	.3
Work Part-Time 81	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income 81 Missing	-.6	.34	-1.8	.6	-.9	.18	-2.2	.4	.3	.29	-.3	1.0
Income 81 Top 25%	-.3	.57	-1.6	.9	-1.0	.12	-2.3	.3	.4	.18	-.2	1.1
Income 81 Mid 50%	-.1	.83	-1.1	.9	-.6	.25	-1.7	.4	.3	.28	-.2	.8
Income 81 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Part-Time 81	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence 82 Urban	-.9	.09	-1.9	.1	.4	.48	-.7	1.4	-.2	.53	-.7	.4
Residence 82 Rural	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region 82: West	-.8	.22	-2.1	.5	-.3	.63	-1.7	1.0	.5	.12	-.1	1.2
South 82	-.2	.73	-1.3	.9	-.8	.21	-1.9	.4	1.0	.00	.4	1.5
North Central 82	-.5	.40	-1.7	.7	.2	.70	-1.0	1.5	.6	.04	.0	1.2
Northeast 82	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

^a This parameter is set to zero because it is redundant.

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

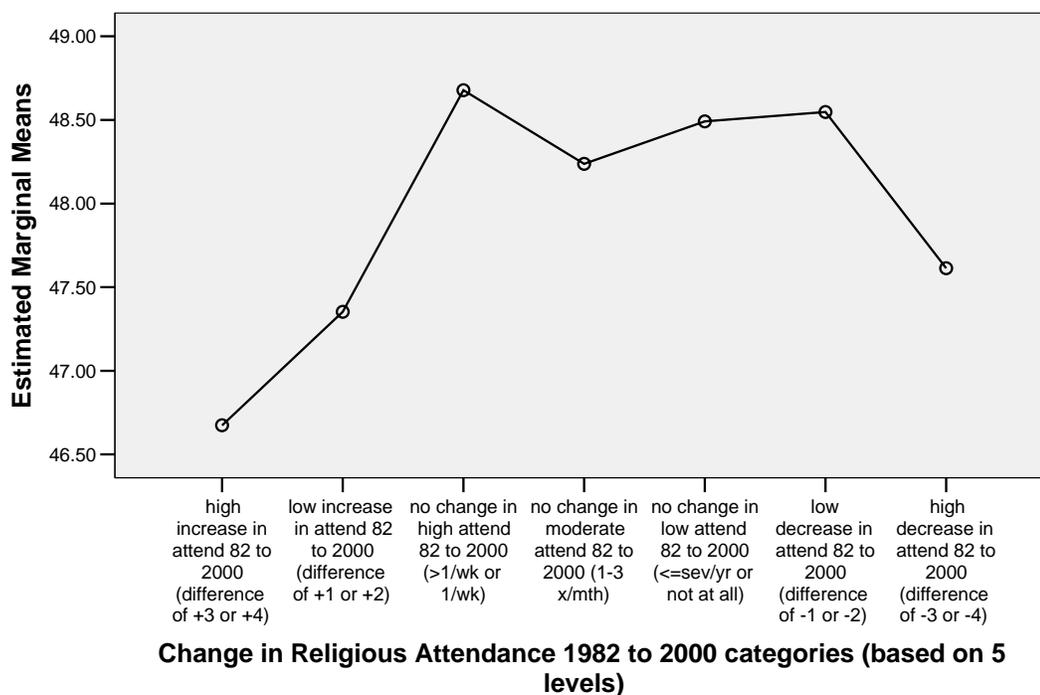


Figure 5.13. Obj. II. Simple Model of Physical Health Composite Score (SF-12 PCS) 2000 by Change in Religious Attendance from 1982 to 2000 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

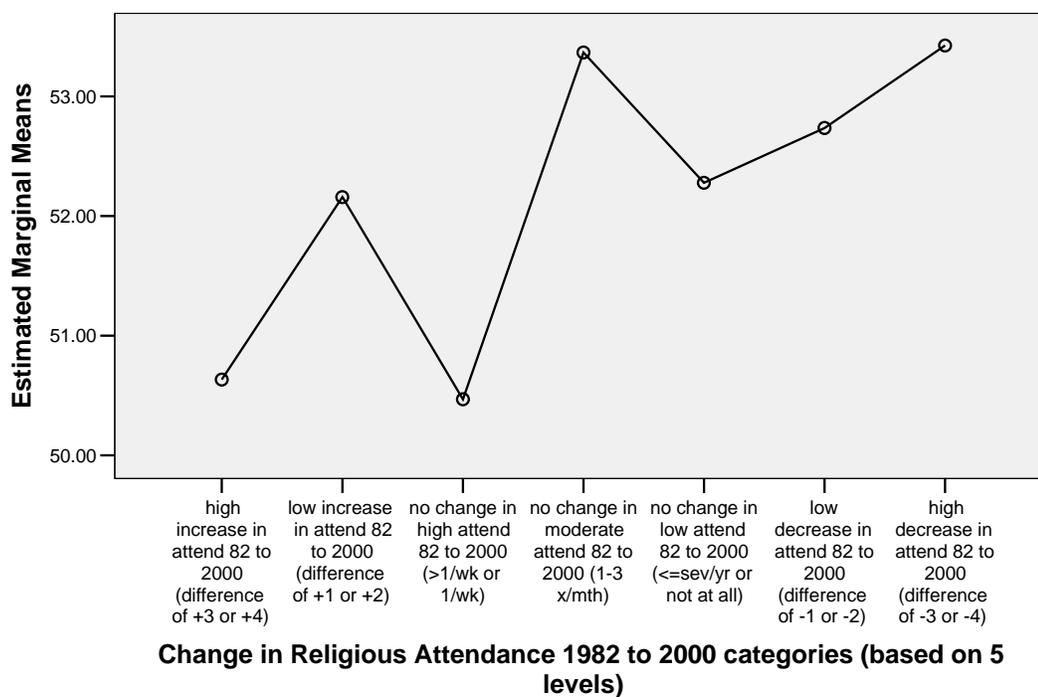


Figure 5.14. Obj. II. Simple Model of Mental Health Composite Score (SF-12 MCS) 2000 by Change in Religious Attendance from 1982 to 2000 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

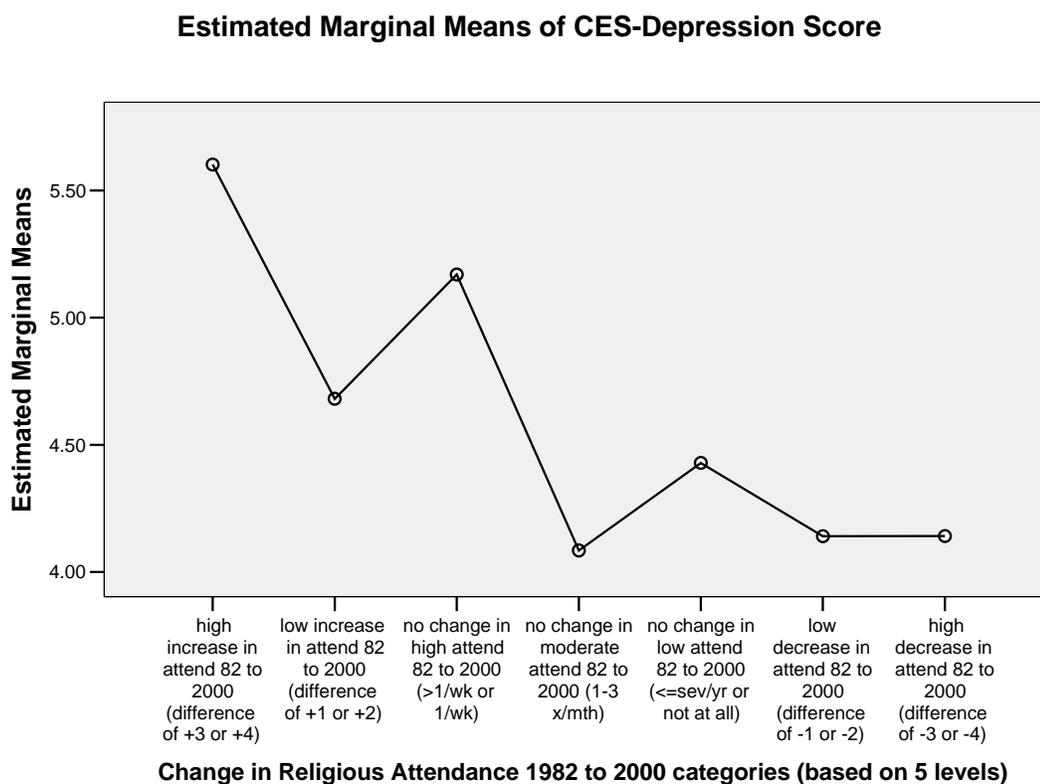


Figure 5.15 Obj. II. Simple Model of CES-Depression Score (CES-D) 2000 by Change in Religious Attendance from 1982 to 2000 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Objective II.5. The effect of 1982 sociodemographic modifiers on the association between change in religious attendance 1982 and physical health, mental health, and depression 2000.

Results for Objective II.5. Change in religious attendance significantly interacted with certain 1982 sociodemographic variables for each outcome of health (as described below) in the presence of 1982 controls (at $p \leq 0.10$ for the ANOVA F test for overall significance and for the individual Parameter Estimates). These same interactions were still found to be significant in the presence of both sociodemographic 1982 and 1998 controls in each model.

Below I describe each of the one two-way interactions of change in religious attendance with specific 1982 sociodemographic variables for each of the models with physical health, mental health, or depression as the dependent variables. The accompanying figures illustrating each interaction are listed after the text descriptions of the interactions. These figures are presented rather than the ANOVA and parameter estimate tables for simplicity of observing the effect of each interaction upon the health outcome.

Physical Health: One Two-way Interactions of Health Limitations, Education, Children, each with Change in Attendance from 1982 to 2000

For the model with the outcome variable of physical health, the sociodemographic variables of health limitation in 1981, education in 1982, number of children in 1982, and net family income in 1981 each interacted in one two-way interactions with the change in religious attendance from 1982 to 2000 variable. In a two two-way interaction, only health limitations and education were meaningfully significant.

One Two-Way Interaction: Health Limitation 1981 by Change in Attendance from 1982 to 2000

Those who reported that health could limit the amount or kind of work that they could do for pay also varied in physical health score depending on the level of change in religious attendance from 1982 to 2000. Those who reported a health limitation in 1981, and no change in low to moderate attendance, reported the best physical health scores, while those with changes in attendance over time had lower scores. Among those who reported no health limitations in 1981, physical health scores remained fairly constant among the various levels of change in attendance (refer to Figure 5.16). The ANOVA overall F test of the interaction was significant, but not the parameter estimates (ANOVA F test = 1.918, $p=0.075$).

One Two-Way Interaction: Education 1982 by Change in Attendance from 1982 to 2000

Physical health scores did not vary across different levels of change in attendance from 1982 to 2000 for those with some high school education or more. For those with less than a high school education, however, physical health scores varied across changes in attendance. Particularly for those with less than a high school education and a high decrease in attendance from 1982 to 2000, physical health scores were remarkably lower than all other levels (refer to Figure 5.17). Better physical health scores for those with less than a high school education occurred for no change in moderate attendance over time or a low decrease in attendance over time.

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

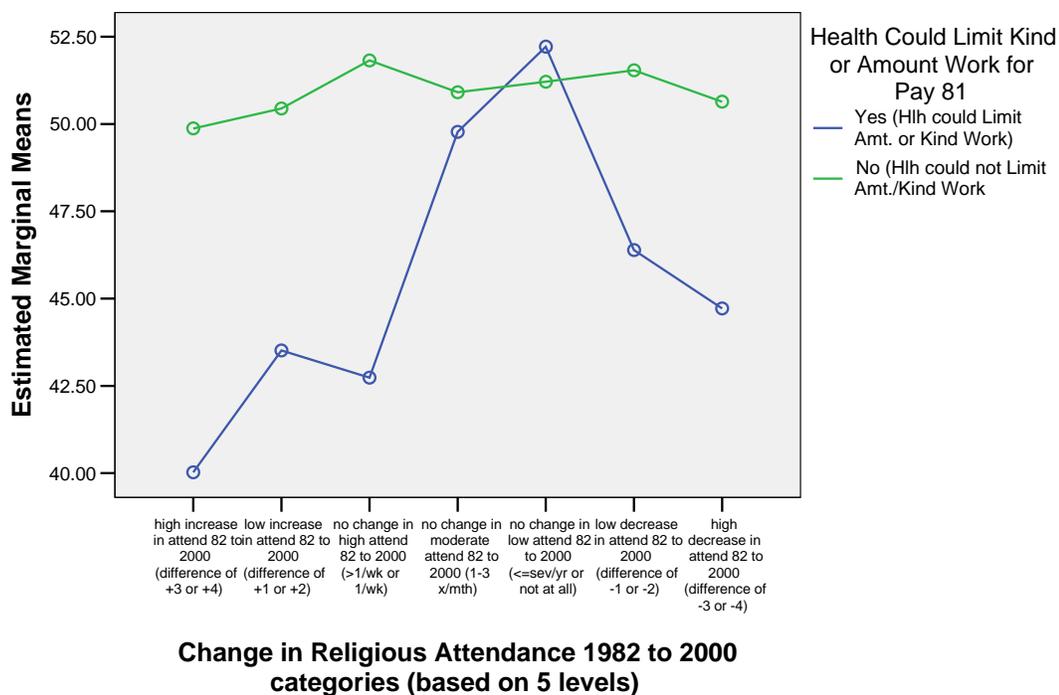


Figure 5.16 Obj. II. Model of Physical Health Composite Score (SF-12 PCS) 2000 One Two-Way Interaction of Change in Religious Attendance 1982 to 2000 with Baseline Health Limitations in Amount or Kind of Work One Could Do for Pay in 1981 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS) 2000

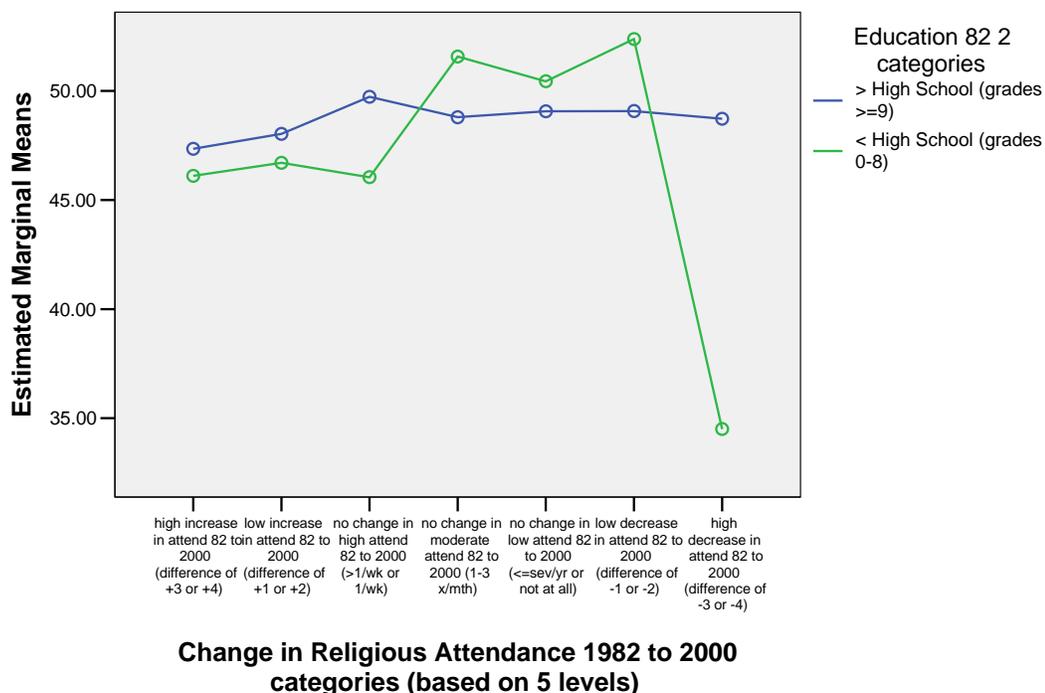


Figure 5.17 Obj. II. Model of Physical Health Composite Score (SF-12 PCS) 2000 One Two-Way Interaction of Change in Religious Attendance 1982 to 2000 with Education in 1982 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

One Two-Way Interaction: Children 1982 by Change in Attendance from 1982 to 2000

Physical health scores in 2000 remained fairly constant regardless of the change in attendance levels among those not living with children in 1982. However, physical health scores in 2000 fluctuated across changes in attendance levels for those with one or more children in 1982. For those with two or more children, the best physical health scores occurred at no change in moderate attendance and low decrease in attendance

(refer to Figure 5.18). Likewise, for those with one child, the best physical health scores occurred at no change in high attendance over time.

Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS) 2000

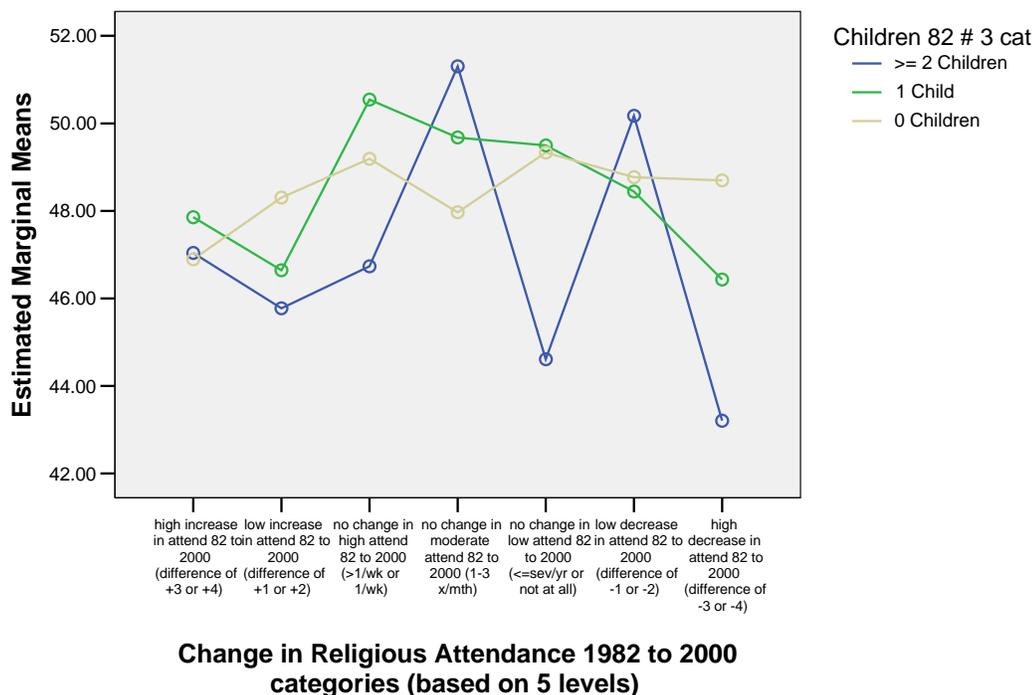


Figure 5.18 Obj. II. Model of Physical Health Composite Score (SF-12 PCS) 2000 One Two-Way Interaction of Change in Religious Attendance 1982 to 2000 with the Number of Children Living in the Household (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Mental Health: One Two-way Interaction of Race/Ethnicity with Change in Attendance from 1982 to 2000

One Two-Way Interaction: Race/Ethnicity by Change in Attendance

The only interaction with change in religious attendance that was significant for the model of mental health was race/ethnicity. Particularly for African Americans, mental

health scores fluctuated across the various levels of change in attendance. Among African Americans, the lowest mental health score in 2000 occurred among those with no change in high attendance from 1982 to 2000 (refer to Figure 5.19).

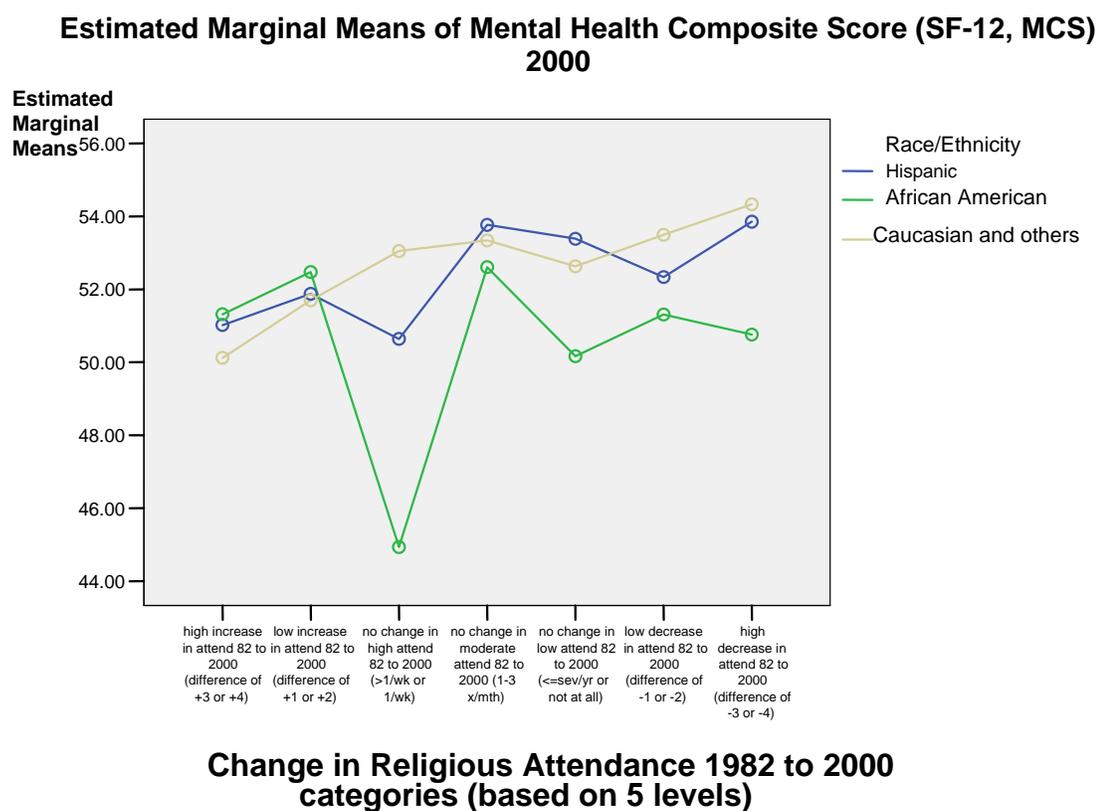


Figure 5.19 Obj. II. Model of Mental Health Composite Score (SF-12 MCS) 2000 One Two-Way Interaction of Change in Religious Attendance 1982 to 2000 with Race/Ethnicity (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Depression: One Two-way Interaction Race/Ethnicity and Health Limitation 1981 each with Change in Attendance from 1982 to 2000

One Two-Way Interaction: Health Limitation 1981 by Change in Attendance

Those with health limitations varied in depression scores depending on the exhibited level of change from 1982 to 2000. Among those who reported that health could limit the kind or amount of work for pay they could do in 1981, those who reported no change in high attendance reported the lowest depression scores, while those with a high increase in attendance reported the highest depression scores (refer to Figure 5.20).

One Two-Way Interaction: Race/Ethnicity by Change in Attendance

For African Americans, there was a fluctuation in depression scores among the various levels of change in attendance. Among African Americans, the highest depression score occurred among those who reported no change in high attendance from 1982 to 2000 (refer to Figure 5.21).

One Two-Way Interaction: Child Number Living in the Household by Change in Attendance

The highest depression scores were reported among those respondents living with two or more children in a household and no change in high attendance from 1982 to 2000. The remaining depression scores among those with one or no children fluctuated mildly across the various change in attendance levels over time (refer to Figure 5.22).

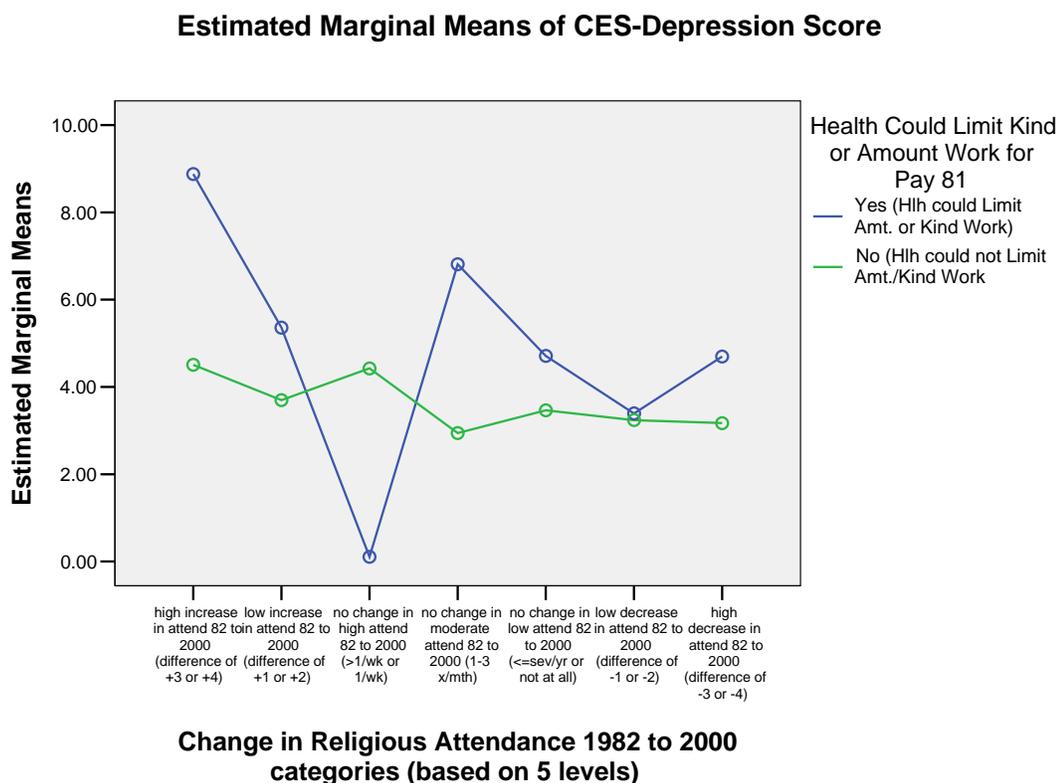


Figure 5.20 Obj. II. Model of CES-Depression Score (CES-D) 2000 One Two-Way Interaction of Change in Religious Attendance 1982 to 2000 with Baseline Health Limitations in Amount or Kind of Work One Could Do for Pay in 1981 (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

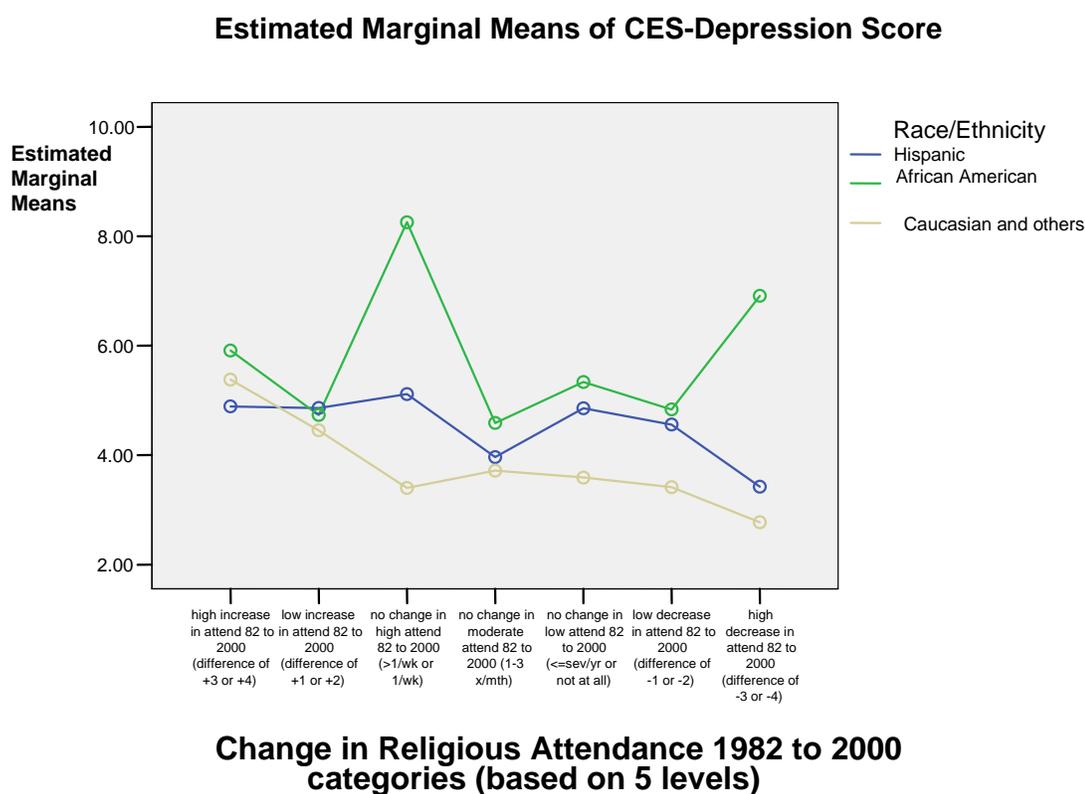


Figure 5.21 Obj. II. Model of CES-Depression Score (CES-D) 2000 One Two-Way Interaction of Change in Religious Attendance 1982 to 2000 with Race/Ethnicity (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

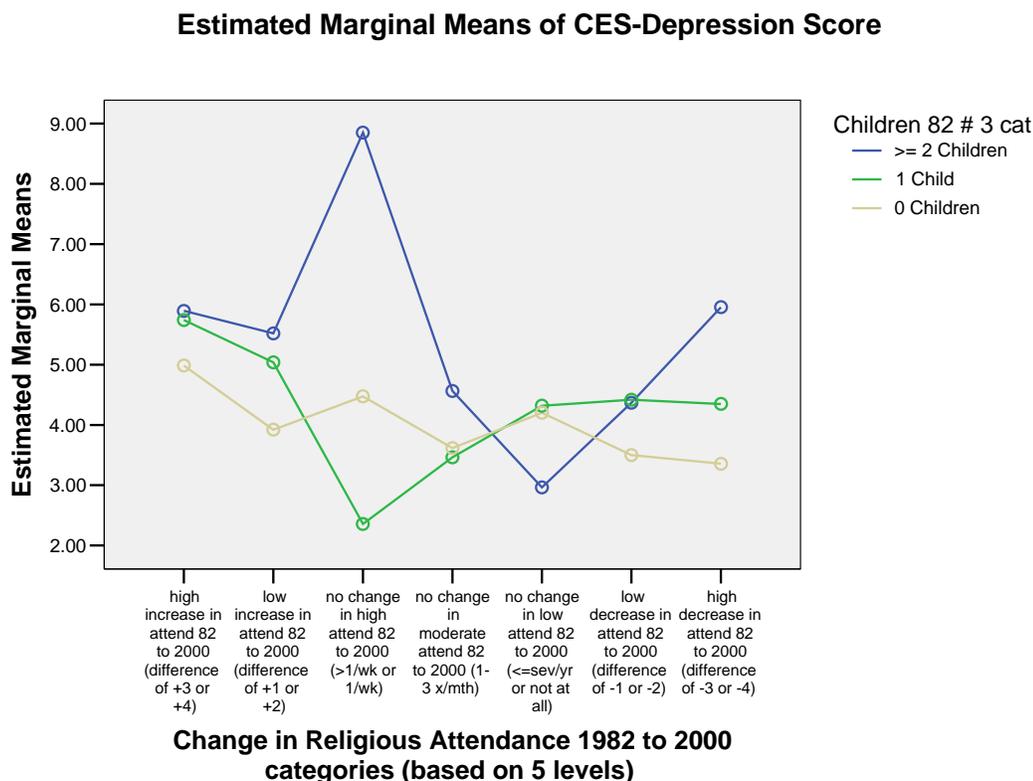


Figure 5.22 Obj. II. Model of CES-Depression Score (CES-D) 2000 One Two-Way Interaction of Change in Religious Attendance 1982 to 2000 with the Number of Children Living in the Household (controlling for baseline health limitations in amount or kind of work one could do for pay in 1981 and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981 and residence and region).

Multicollinearity among the Religious Variables of Attendance, Change in Attendance and Affiliation

Tests for multicollinearity and correlation revealed that the change in religious attendance from 1982 to 2000 was collinear with the attendance 1982 variable (Condition Index 15, correlation $r = -0.7$), as well as the affiliation variable (Condition Index 11, correlation $r = -0.7$). Therefore, attendance 1982 and affiliation 1982 were not included in the above models.

Relationship between Religious Attendance 1982 and Health 2000, controlling for Change in Attendance 1982 to 2000

Models were explored to examine the influence of attendance, controlling for change in attendance. Early adulthood attendance in 1982 was not significant, when controlling for change in attendance 1982 to 2000, for any of the health outcomes. Controlling for change in attendance from 1982 to 2000, attendance in 1982 was significant only when it interacted with certain 1982 sociodemographic variables. Because of the potential problem of multicollinearity and high correlation between religious attendance and change in attendance, however, these results may not be valid. Education 1982 and region 1982 modified the effect of religious attendance in 1982 on physical health in 2000. Race/Ethnicity, number of children in 1982 (and region living in 1982 [for the model with mental health as an outcome]) modified the effects of religious attendance in 1982 on mental health and depression in 2000, similar to the model (without controlling for change in attendance 1982 to 2000) described in Objective II. In addition to 1982 sociodemographic factors, 1998 sociodemographic factors were added to this model. 1998 factors that modified the influence of attendance in 1982 on particular health outcomes in 2000 included work amount in 1997 on physical health and net family income in 1997 on depression.

Conclusion: Summary of Objective II

Religious attendance in early adulthood was associated with better mental health and less depression in mid-adulthood. This effect was modified by ethnicity and number of children living in the household. Caucasians and those with no children who attended more frequently reported better mental health scores and reported fewer depressive symptoms compared to other ethnicities. In addition, they reported fewer depressive symptoms than those living with two or more children in 1982.

Religious affiliation in young adulthood was associated with better physical health in mid-adulthood. Those who identified with the Jewish faith in their early 20s reported the best physical health scores and lowest depression scores, compared with those of other affiliations. Those with no affiliation in their early 20s reported the lowest physical health scores and highest depression scores in their early 40s, while those who identified with a religious affiliation reported better health scores.

Generally, those who reported being consistent in their religious attendance, particularly those showing no change in moderate attendance (one to three times per month) from 1982 to 2000, reported better physical health, mental health, and depression scores than those who reported changes in attendance. However, in some instances a low decrease in attendance was associated with better health scores.

Discussion of Objective II

Strengths:

The strength of the study is the advantage of having a nationally representative sample of young adults followed over a 20-year period from 1979 to 2000. The results benefit from having two time points at which to measure religious attendance, in early adulthood in 1982 and in later mid adulthood in 2000, making it possible to examine the change in attendance over this eighteen-year period.

Limitations:

Study limitations include having few data points for religious attendance, with a large gap of almost 20 years for which there was no attendance information. Although the change in attendance from 1982 to 2000 can be measured, fluctuations in attendance during this time cannot be measured. The dataset is also limited in having only one point in time, in 2000, at which to measure health. The health module was added in

1998, and administered only once to each respondent, at the point of turning 40 or over after 1998. Therefore, changes in health status along with changes in religious attendance cannot be measured over time. There were few health variables available at the beginning of the study to control for baseline health status, so the ability to control for reverse causality was limited. The health variable available, “health could limit the amount or kind of work for pay the respondent could do,” was somewhat crude.

The study was further limited by the restrictive range of the religious or spiritual questions. Respondents were asked only about attendance and affiliation, the latter limited almost entirely to the Judeo-Christian tradition. Spousal attendance and affiliation were included, but since these questions were limited to those who reported having been married, it excluded respondents from responding who were in non-married domestic partnerships.

Those who increased in attendance from 1982 to 2000 reported having poorer physical health, poorer mental health, and more depressive symptoms than those who remained at the same level of attendance from 1982 to 2000. However, there was a potential problem of reverse causality. It cannot be determined from the data whether poorer health drives changes in attendance or changes in attendance produce poorer health. The baseline health measure of 1981 was crude. This baseline measures “whether health could limit the kind or amount of work one could do for pay.”

For the interaction of change in attendance and health limitations, those who reported a high increase in attendance or no change in moderate attendance also reported the highest depression scores (refer to Figure 5.20). For physical health, those who

reported a health limitation in 1981, and reported a high increase in attendance from 1982 to 2000, also reported low physical health scores in 2000 (refer to Figure 5.16).

There was no intermediary health information available, during the period of 1982 to 2000, to determine whether changes in health were experienced during this almost 20-year gap, in order to explain the changes in attendance.

However, it is clear from the data that associations between attendance and health can be observed, as described above in the summary for Objective II.

Future Research Recommendations:

This study consistently showed that African Americans reported poorer mental health and higher depression scores than Caucasians and Hispanics. Although more frequent religious attendance during early adulthood was associated with better mental health and lower depression scores among Caucasians, the opposite trend was observed for African Americans, and more mildly so for Hispanics. It is unclear whether ethnicities who attend more frequently in early adulthood are already in poorer mental health before attending.

The findings that higher religious attendance levels for Caucasians during their early 20s (in 1982) is associated with better mental health and less depression in their early 40s (in 2000), yet attendance during their 40s (in 2000) is associated with poorer mental health and more depression (in 2000), are interesting results which require additional study to help elucidate these contradictory trends.

Another consistent finding in the various models run is that those living with two or more children in 1982 reported fluctuating mental health and depression scores later in

life, depending on level of attendance in 1982, whereas those living with no children in 1982 reported better mental health scores and lower depressive symptoms in 2000, with increasing attendance. Because of lack of adequate measures of mental health and depression prior to 1982 and during the eighteen years of the follow-up, it is unclear whether those with more children were more depressed before 1982.

Another interesting, consistent finding in Objective II as well as in Objective I is that those affiliated with the Jewish faith reported better physical health scores, controlling for attendance and other sociodemographic variables. In a model with no control for attendance, affiliation was significantly related to mental health and depression, with those of the Jewish faith having the best health scores. Again, because of the low frequency of those affiliated with the Jewish faith, the results may not be reliable. However, it would be interesting in future studies to examine why this association exists, and to test possible mediators to explain it.

Future survey rounds for this data may inquire of religious attendance again. It would be interesting to conduct follow-up analyses, particularly if additional or subsequent religious and health variables were included in later years among the same respondents.

Policy Implications:

Epidemiology of religion is a relatively new field of study, gaining in prominence rapidly over the last decade. It may therefore be premature to attempt to influence policies on the basis of this research. More studies are needed if we are to establish reliable associations among various forms of religious beliefs and practices, behaviors, and physical and mental health outcomes.

Follow-up research on religious attendance, particularly on the differential effects of race/ethnicity and number of children that might mediate the influence of religious attendance on mental health and depression, is suggested.

This study provides some guideposts for examining this relationship, particularly among differential effects that ethnicities, the number of children (or more generally within the context of family dynamics), and religious affiliations may have on the practice of attendance at religious services and their corresponding effects on health, particularly mental health and depression.

CHAPTER 6 Objective III Results

Results for Objective III

Test for Mediation by Lifestyle and Behaviors of Alcohol Dependency (1994) and Cigarette Smoking Frequency (1994) on The Relationship between Religious Attendance (1982) in Early Adulthood and Physical Health, Mental Health, and Depression in mid-Adulthood (2000)

Overview of Chapter

In this chapter I describe the results for Objective III as explained in Chapter 3 on methods and objectives. Objective III is designed to test evidence of mediation of lifestyle and behaviors, specifically alcohol use and cigarette smoking, to help explain the relationship between religious attendance and each health variable. The other objective is to test the effect of religious attendance during young adulthood on mid-adulthood alcohol use and cigarette smoking. The chapter is organized as follows. First, I describe the mediators of alcohol use and cigarette smoking. A brief summary of the objectives and methods is presented, followed by a detailed description of the results. The chapter concludes with a discussion of the strengths and limitations of the study, related future research suggestions, and possible policy implications of the results.

Descriptives of Behavior and Lifestyle Factors

The descriptives for the 1994 behavior and lifestyle factors for alcohol abuse and dependency, frequency of heavy alcohol drinking, and cigarette smoking frequency are cross-tabulated by religious attendance 1982, as listed in Table 6.1.

Table 6.1 Obj. III. Descriptives of Alcohol Abuse and Dependency 1994, Heavy Drinking 1994, and Cigarette Smoking 1994 by Religious Attendance in 1982 Unweighted.

Behaviors 1994	Religious Attendance 1982										Variable Row Totals	
	1.00 >1/wk		2.00 1/wk		3.00 1-3/mth		4.00 Infrequent (<=Sev./yr)		5.00 Not at all		#	Var. Row Total
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %		
Alcohol Abuse or Dependency => 1 symptom occur >= 1 time in last year 0 symptoms occur in last year NonDrinker (no alcohol in past mth or since last interview 1989)	18	2.9	65	10.4	123	19.7	233	37.3	185	29.6	624	30.7
	42	6.6	96	15.2	163	25.8	200	31.6	132	20.9	633	31.1
	75	9.7	135	17.4	180	23.2	212	27.3	174	22.4	776	38.2
Heavy Alcohol Drinking Frequency Drink >=6 drinks on one occasion =>1times in last month 0 times in last month (never) Nondrinker ^a	17	3.0	57	10.0	118	20.7	199	34.9	180	31.5	571	29.0
	37	5.9	95	15.2	152	24.4	213	34.1	127	20.4	624	31.7
	75	9.7	135	17.4	180	23.2	212	27.3	174	22.4	776	39.4
Cigarette Smoking Frequency =>20 cig./day <=19 cig./day	11	3.7%	27	9.2%	44	15.0%	96	32.7%	116	39.5%	294	14.9%
	8	3.1%	27	10.5%	53	20.7%	98	38.3%	70	27.3%	256	13.0%
0 frequency (Nonsmoker ^b)	110	7.8%	232	16.4%	353	24.9%	428	30.2%	294	20.7%	1417	72.0%
Table Total	135	6.6%	296	14.6%	466	22.9%	645	31.7%	491	24.2%	2033	100%

^a Non-Smokers are defined as not smoking >=100 cigarettes in lifetime, or never smoked daily or not currently smoking or smoking occasionally. These individuals are treated as “valid skips” in the survey.

^b Non-Drinkers are defined as not drinking in last month or year. These individuals were treated as “valid skips” in the survey.

Alcohol Abuse or Dependency 1994 Descriptives

In 1994, approximately one-third of the cohort had experienced at least one symptom of alcohol abuse or dependency at least once during the past year. Approximately one-third had not experienced any symptoms, and the remaining were nondrinkers, defined as not having had a drink either in the past month or since the last interview, 1989. The nondrinkers were determined from valid skips for the alcohol-related questions.

Heavy Drinking 1994 Descriptives

Approximately one-third had experienced one or more episodes of heavy drinking in the last month. Heavy drinking was defined as number of times in the past month of having six or more drinks on one occasion. Approximately one-third had not experienced any episodes of heavy drinking in the last month, and the remainder were considered non-drinkers.

Cigarette Smoking Frequency 1994 Descriptives

Approximately one-third smoked cigarettes, approximately equally sub-divided between those who smoked one or more packs per day and those who smoked less than a pack per day. The remaining two-thirds were defined as non-smokers for the purposes of this study. A nonsmoker was defined as having smoked less than 100 cigarettes in a lifetime, or having never smoked daily or not smoking currently or smoking only occasionally. The nonsmokers were determined from being a valid skip for the cigarette smoking frequency questions.

Those with one or more symptoms of alcohol abuse and dependency and of heavy alcohol drinking in 1994 most commonly attended religious services infrequently in 1982, similar to those with no symptoms, and nondrinkers. Among heavy smokers in

1994, the highest frequency of attendance in 1982 was not at all, compared with infrequent attendance for those who smoked less or not at all.

Weighted Descriptive Statistics for Alcohol Abuse or Dependency, Heavy Drinking and Cigarette Smoking 1994

The 1994 unweighted descriptive statistics of alcohol abuse or dependency, heavy drinking, and cigarette smoking were weighted using the year 2000 sample weight. There were few differences in the unweighted compared to the weighted descriptive statistics, all within a plus or minus 5 percent difference (compare Table 6.1 to Table 6.2 and Table 6.3). The size of the United States noninstitutionalized population of which this study sample is representative was 9.0 million people in 1994 (refer to Table 6.3).

Table 6.2 Obj. III. Descriptives of Alcohol Abuse or Dependency 1994, Heavy Drinking 1994, and Cigarette Smoking 1994 by Religious Attendance in 1982 Weighted (2000 sample weight divided by mean sample weight to obtain original sample size of approximately 2102 in order to directly compare frequency and percentage of each variable with the unweighted descriptive statistics) ^{a, b}

Behaviors 1994		Religious Attendance 1982										Variable Row Totals	
		1.00 >1/wk		2.00 1/wk		3.00 1-3/mth		4.00 Infrequent (<=Sev./yr)		5.00 Not at all		#	Var. Row Total
#	Row %	#	Row %	#	Row %	#	Row %	#	Row %	#			
Alcohol Abuse or Dependency	>= 1 symptom occur >= 1 time in last year	17	2.5	58	8.6	127	19.0	264	39.4	204	30.4	670	32.9
	0 symptoms occur in last year	44	6.5	95	14.3	154	23.1	217	32.5	157	23.5	668	32.8
	NonDrinker (no Alcohol in past mth or since last interview 1989)	69	9.9	125	17.9	143	20.5	195	27.8	168	24.0	700	34.4
Heavy Alcohol Drinking Frequency	>=1times in last month	16	2.7	55	9.1	118	19.6	218	36.3	194	32.3	601	30.2
	0 times in last month (never)	41	6.0	92	13.4	151	22.0	245	35.8	156	22.8	686	34.5
	Nondrinker ^c	69	9.9	125	17.9	143	20.5	195	27.8	168	24.0	700	35.2
Cigarette Smoking Frequency	>=20 cig./day	13	3.6	30	8.3	53	14.6	110	30.4	157	43.1	363	18.3
	<=19 cig./day	9	4.1	19	9.2	39	18.8	82	39.0	61	28.9	210	10.6
	0 freq. (Nonsmoker ^d)	105	7.4	223	15.7	320	22.6	465	32.9	301	21.3	1413	71.2
Table Total		129	6.3	279	13.7	425	20.9	676	33.2	529	25.9	2038	100.0

^a The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups which were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

^b The year 2000 sample weight is used for the descriptive statistics of the 1994 variables because the sample for the study is selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

^c Non-Smokers are defined as not smoking >=100 cigarettes in lifetime, or never smoked daily or not currently smoking or smoking occasionally. These individuals are treated as "valid skips" in the survey.

^d Non-Drinkers are defined as not drinking in last month or year. These individuals were treated as "valid skips" in the survey.

Table 6.3 Obj. III. Descriptives of Alcohol Abuse or Dependency 1994, Heavy Drinking 1994, and Cigarette Smoking 1994 by Religious Attendance in 1982 Weighted (2000 sample weight used to obtain descriptive statistics of the noninstitutionalized U.S. population living in the U.S. in 1978 who were born between 1957 and 1964 and turned 40 and over in the year 2000).^{a, b}

Behaviors 1994		Religious Attendance 1982									Variable Row Totals		
		1.00 >1/wk		2.00 1/wk		3.00 1-3/mth		4.00 Infrequent (<=Sev./yr)		5.00 Not at all		#	Var. Row Total
		#	Row %	#	Row %	#	Row %	#	Row %	#	Row %		
Alcohol Abuse or Dependency	>= 1 symptom occur >= 1 time in last year	73907	2.5	256956	8.6	565177	19.0	1171945	39.4	904054	30.4	2972039	32.9
	0 symptoms occur in last year	193915	6.5	423651	14.3	685139	23.1	963074	32.5	696849	23.5	2962628	32.8
	NonDrinker (no Alcohol in past mth or since last interview 1989)	306266	9.9	555205	17.9	636306	20.5	864192	27.8	744437	24.0	3106406	34.4
Heavy Alcohol Drinking Frequency Drink >=6 drinks on one occasion	>=1times in last month	71590	2.7	243835	9.1	523098	19.6	967345	36.3	860967	32.3	2666835	30.2
	0 times in last month (never)	182480	6.0	409391	13.4	670524	22.0	1088845	35.8	692939	22.8	3044179	34.5
	Nondrinker ^c	306266	9.9	555205	17.9	636306	20.5	864192	27.8	744437	24.0	3106406	35.2

Table 6.3 (Continued).

Behaviors 1994	Religious Attendance 1982										Variable Row Totals	
	1.00 >1/wk		2.00 1/wk		3.00 1-3/mth		4.00 Infrequent (<=Sev./yr)		5.00 Not at all		#	Var. Row Total
	#	Row %	#	Row %	#	Row %	#	Row %	#	Row %		
0 times in last month (never)	182480	6.0	409391	13.4	670524	22.0	1088845	35.8	692939	22.8	3044179	34.5
Nondrinker ^a	306266	9.9	555205	17.9	636306	20.5	864192	27.8	744437	24.0	3106406	35.2
Cigarette Smoking Frequency												
>=20 cig./day	57338	3.6	133488	8.3	235580	14.6	489570	30.4	695196	43.1	1611172	18.3
<=19 cig./day	38339	4.1	85588	9.2	175034	18.8	362534	39.0	268435	28.9	929929	10.6
0 freq. (Nonsmoker ^d)	464659	7.4	987460	15.7	1419314	22.6	2065073	32.9	1333297	21.3	6269803	71.2
Table Total	574088	6.3	1235812	13.7	1886621	20.9	2999211	33.2	2345340	25.9	9041073	100.0

^a The 2000 weight adjusts for loss to follow-up after the year 1979 in which the survey was administered through the year 2000. The sample 2000 weight adjusts for over-sampling of minorities, particularly Hispanics and African Americans. The weight also adjusts for two groups which were over-sampled and later dropped from the study. In 1985 an over-sample of approximately 1000 military personnel were dropped while 200 remained in the sample. In 1991 the over-sample of economically disadvantaged Caucasians was dropped from the study. The above descriptive statistics describe those individuals who were aged 40 and over in the year 2000, from a sample designed to be representative of noninstitutionalized people born between 1957 through 1964, living in the United States in 1978 (S. McClaskie, personal communication, Fall 2005).

^b The year 2000 sample weight is used for the descriptive statistics of the 1994 variables because the sample for the study is selected in the year 2000 (J. Zagorsky, personal communication, Fall 2005).

^c Non-Smokers are defined as not smoking >=100 cigarettes in lifetime, or never smoked daily or not currently smoking or smoking occasionally. These individuals are treated as “valid skips” in the survey.

^d Non-Drinkers are defined as not drinking in last month or year. These individuals were treated as “valid skips” in the survey.

Mediators of alcohol abuse or dependency, heavy alcohol drinking, and frequency of cigarette smoking of the relationship between young adulthood religious attendance and mid-adulthood physical health, mental health, and depression

Objective III.1. Determine whether 1994 lifestyle and behaviors of (1) alcohol abuse or dependency, (2) frequency of heavy alcohol drinking, and (3) cigarette smoking frequency mediate the relationship between religious attendance in young adulthood in 1982 to physical health, mental health, and depression in 2000.

Methods for Objective III.1.: Tests for mediation of lifestyle and behaviors, particularly alcohol abuse or dependency, heavy alcohol drinking, and cigarette smoking frequency in 1994 were performed on the simple model of religious attendance in 1982 on the dependent health variables of physical health, mental health, and depression in 2000, controlling for 1982 sociodemographic variables. An explanation of the tests for mediation is described in greater detail in Chapter 3.

Results for Objective III.1

Depression

Alcohol abuse or dependency in 1994 and alcohol drinking in 1994 were each partial mediators (although alcohol drinking showed evidence only as a very mild mediator) on the effect of religious attendance in early adulthood, in 1982, on depression in mid-adulthood, in 2000. Cigarette smoking frequency in 1994 mediated almost completely the effect of religious attendance in early adulthood in 1982 on depression in mid-adulthood, in 2000 (refer to Table 6.4 and Table 6.5).

In a simple model (without the presence of mediators), religious attendance in 1982 was significantly related to lower depression scores in 2000, controlling for other 1982 sociodemographic variables, as demonstrated in Chapter 5. In the presence of the mediator of alcohol abuse or dependency, however, the effect of religious attendance on depression became less significant overall, and less significant at most of the individual levels of religious attendance. Likewise, alcohol abuse or dependency and heavy alcohol drinking were related to higher depression scores (refer to Table 6.4, Table 6.5, Figure 6.1, and Figure 6.2).

It should be noted that although the variable of heavy alcohol drinking was significant overall in the model (ANOVA F test = 6.6, $p=0.001$), only the level of heavy drinking at 0 frequency showed a result that was significantly different from that of the nondrinkers ($B= -0.6$, $p = 0.015$). Therefore, it appears that within the heavy alcohol drinking variable, only the level of alcohol drinking (defined at heavy drinking at 0 frequency) acts as a mediator, not the level of heavy alcohol drinking.

In summary, the mediators of alcohol abuse or dependency and alcohol drinking explain some of the variance in depression 2000 scores, which were previously attributed to religious attendance 1982 in the simple model (without the presence of the mediators).

In the presence of the mediator of cigarette smoking in 1994, the effect of the various levels of religious attendance in 1982 on depression in 2000 was borderline or no longer significant. Heavy cigarette smoking in 1994 was significantly related to higher depression scores in 2000 (Figure 6.3). The unique variance in depression scores in 2000, which religious attendance in 1982 previously explained in the simple model (in

the absence of the mediator) is now almost completely explained by the behavior of cigarette smoking (refer to Table 6.4 and Table 6.5).

Table 6.4 Obj. III. ANOVA Table. Mediators of Alcohol Abuse or Dependency in 1994, Heavy Alcohol Drinking in 1994 and Cigarette Smoking in 1994 for Simple Model CES-Depression Scores (CES-D) in 2000 by Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981 and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region)

Independent Variables 1982 Source	CESD 2000 Simple Model			CESD 2000 Alcohol Abuse/Depend 1994 Mediator			CESD 2000 Heavy Alcohol Drinking 1994 Mediator			CESD 2000 Cigarette Smoking 1994 Mediator		
	df	F	Sig.	df	F	Sig.	df	F	Sig.	df	F	Sig.
Corrected Model	21	5.9	.000	23	6.2	.000	23	5.9	.000	23	7.5	.000
Intercept	1	162.9	.000	1	161.8	.000	1	143.1	.000	1	174.6	.000
Religious Attendance 1982	4	2.4	.052	4	1.9	.110	4	2.2	.066	4	1.3	.261
Health Could Limit Amt/Kind Work 1981	1	16.1	.000	1	16.4	.000	1	14.7	.000	1	13.5	.000
Gender	1	14.0	.000	1	15.7	.000	1	21.0	.000	1	21.7	.000
Race/Ethnicity	2	6.7	.001	2	6.5	.002	2	4.8	.009	2	8.1	.000
Marital 1982	2	.4	.701	2	.4	.661	2	.7	.520	2	.8	.469
Education 1982	1	.2	.659	1	.2	.668	1	.1	.821	1	.0	.841
Child # in Household 1982	2	7.0	.001	2	6.6	.001	2	5.7	.004	2	4.6	.010
Work Amount 1981	1	.6	.424	1	.6	.456	1	.4	.545	1	.6	.444
Net Family Income 1981	3	.8	.476	3	.7	.561	3	.9	.439	3	.7	.535
Residence 1982	1	.4	.538	1	.4	.524	1	.8	.380	1	.1	.708
Region 1982	3	2.8	.039	3	2.9	.034	3	3.3	.019	3	2.9	.034
Alcohol Abuse and Dependency 1994				2	9.6	.000						
Heavy Alcohol Drinking Frequency 1994							2	6.6	.001			
Cigarette Smoking Frequency 1994										2	24.0	.000
Error	1811			1809			1757			1754		
Total	1833			1833			1781			1778		
Corrected Total	1832			1832			1780			1777		
a Adj. R Squared	0.053			0.062			0.059			0.078		

Mental Health

The only significant partial mediator for the relationship between attendance in 1982 and mental health scores in 2000 was cigarette smoking frequency. Alcohol abuse or dependency and heavy alcohol drinking did not reveal evidence of mediation in the relationship between religious attendance in 1982 and mental health scores in 2000. In the simple model (without the presence of the mediator), religious attendance 1982 was significantly related to better mental health scores in 2000 (ANOVA F test = 2.86, $p=0.022$; refer to Table 6.4), controlling for other sociodemographic variables. For example, at attendance levels ranging from more than once per week to infrequent, mental health scores improved ($B = 2.2$ to 1.4 , $p<0.05$). When the mediator of cigarette smoking frequency in 1994 was added to the model, the overall significance of religious attendance lessened (ANOVA F test = 2.56, $p=0.037$), and each individual level of religious attendance in 1982 became less significant. Heavy cigarette smoking frequency was significantly related to lower mental health scores in the model (overall significance: ANOVA F test = 7.52, $p=0.001$, and the individual level of heavy cigarette smoking was significant at $B = -2.2$, $p=0.00$; refer to Figure 6.4).

Physical Health

There was no evidence of mediation for any of the potential mediators of alcohol abuse or dependency, heavy alcohol drinking, or cigarette smoking frequency for the relationship between religious attendance 1982 and physical health 2000.

Table 6.5 Obj. III. Parameter Estimate Table. Mediators of Alcohol Abuse or Dependency in 1994, Heavy Alcohol Drinking in 1994 and Cigarette Smoking Frequency in 1994 for the Simple Model of CES-Depression Scores (CES-D) in 2000 by Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region)

Independent Variables 1982 Parameter	CESD 2000 Simple Model				CESD 2000 Simple Model 1982 with Alcohol Abuse/Depend 1994 Mediator				CESD 2000 Simple Model 1982 with Heavy Alcohol Drinking 1994 Mediator				CESD 2000 Simple Model 1982 with Cigarette Smoking 1994 Mediator			
	B	Sig	CI 95%		B	Sig	CI 95%		B	Sig.	CI 95%		B	Sig.	CI 95%	
Intercept	2.4	.000	1.1	3.7	2.4	.000	1.1	3.8	2.3	.001	.9	3.6	1.7	.011	.4	3.0
Rel. Attend.(RA) 1982 >1/wk	-1.1	.012	-2.0	-.2	-1.0	.025	-1.8	-.1	-1.0	.027	-1.9	-.1	-.7	.095	-1.6	.1
RA 1982 1/wk	-.6	.083	-1.2	.1	-.5	.138	-1.1	.2	-.5	.116	-1.2	.1	-.3	.334	-1.0	.3
RA 1982 1-3x/mth	-.7	.015	-1.3	-.1	-.6	.032	-1.2	-.1	-.8	.010	-1.4	-.2	-.6	.049	-1.2	.0
RA 1982 <=Sev.x/yr (Infreq.)	-.5	.050	-1.1	.0	-.5	.057	-1.0	.0	-.5	.053	-1.1	.0	-.4	.104	-1.0	.1
RA 1982 Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
1981 Hlh Limits Amt./Kind Work Yes	1.8	.000	.9	2.7	1.8	.000	1.0	2.7	1.8	.000	.9	2.6	1.7	.000	.8	2.6
1981 Hlh Limits Amt./Kind Work No	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	.8	.000	.4	1.2	.9	.000	.4	1.3	1.0	.000	.6	1.5	1.0	.000	.6	1.4
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	.4	.222	-.2	1.0	.4	.234	-.2	.9	.3	.348	-.3	.9	.6	.061	.0	1.2
African American	.9	.000	.4	1.4	.9	.000	.4	1.4	.8	.002	.3	1.3	1.0	.000	.5	1.5
Caucasian and Others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Marital Status: Div./Wid./Sep.1982	-.2	.606	-1.1	.6	-.2	.689	-1.0	.7	-.1	.760	-1.0	.7	-.3	.541	-1.1	.6
Married 1982	-.2	.431	-.8	.3	-.2	.369	-.8	.3	-.3	.253	-.9	.2	-.3	.231	-.9	.2
Never Married 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table 6.5 (Continued).

Independent Variables 1982 Parameter	CESD 2000 Simple Model				CESD 2000 Simple Model 1982 with Alcohol Abuse/Depend 1994 Mediator				CESD 2000 Simple Model 1982 with Heavy Alcohol Drinking 1994 Mediator				CESD 2000 Simple Model 1982 with Cigarette Smoking 1994 Mediator			
	B	Sig	CI 95%		B	Sig	CI 95%		B	Sig.	CI 95%		B	Sig.	CI 95%	
Education Level: >=High School 1982	-2	.659	-1.3	.8	-2	.668	-1.3	.8	-1	.821	-1.2	.9	-1	.841	-1.2	.9
< High School 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
>=2 Children 1982	1.3	.000	.6	2.1	1.3	.001	.5	2.0	1.2	.001	.5	1.9	1.1	.003	.4	1.9
1 Child 1982	.8	.012	.2	1.4	.8	.015	.2	1.4	.7	.027	.1	1.3	.5	.098	-.1	1.1
No Children 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time 1981	-2	.424	-.7	.3	-2	.456	-.7	.3	-2	.545	-.7	.3	-2	.444	-.7	.3
Work Part-Time 1981	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income 1981 Missing	.4	.234	-.3	1.0	.3	.296	-.3	1.0	.4	.181	-.2	1.1	.4	.222	-.2	1.0
Income 1981 Top 25%	.5	.148	-.2	1.1	.4	.185	-.2	1.1	.5	.162	-.2	1.1	.4	.203	-.2	1.1
Income 1981 Mid 50%	.3	.240	-.2	.8	.3	.280	-.2	.8	.4	.189	-.2	.9	.3	.267	-.2	.8
Income 1981 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence 1982 Urban	-2	.538	-.7	.4	-2	.524	-.7	.4	-2	.380	-.8	.3	-.1	.708	-.6	.4
Residence 1982 Rural	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region 1982: West	.5	.130	-.2	1.2	.5	.128	-.1	1.2	.6	.083	-.1	1.3	.6	.076	-.1	1.3
South 1982	.9	.004	.3	1.5	.9	.003	.3	1.5	1.0	.002	.4	1.5	.9	.003	.3	1.5
North Central 1982	.6	.069	.0	1.2	.5	.075	-.1	1.2	.6	.060	.0	1.2	.6	.069	.0	1.2
Northeast 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table 6.5 (Continued).

Independent Variables 1994 Parameter	CESD 2000 Simple Model				CESD 2000 Simple Model 1982 with Alcohol Abuse/Depend 1994 Mediator				CESD 2000 Simple Model 1982 with Heavy Alcohol Drinking 1994 Mediator				CESD 2000 Simple Model 1982 with Cigarette Smoking 1994 Mediator			
	B	Sig	CI 95%		B	Sig	CI 95%		B	Sig.	CI 95%		B	Sig.	CI 95%	
Alcohol 1994 Abuse/Depend >=1 Symptom in past year					.4	.085	-1	.9								
No Symptoms in past year 1994					-.7	.007	-1.1	-.2								
NonDrinker 1994					0(a)	.	.	.								
Heavy Alcohol 1994 Drinking >=1/mth									.3	.185	-2	.9				
Heavy Alcohol 1994 Drinking 0/mth (never)									-.6	.015	-1.1	-.1				
NonDrinker (valid skip) 1994									0(a)	.	.	.				
Cig. Smoking 1994 >=1 pack/day													2.0	.000	1.4	2.6
Cig. Smoking 1994 < pack/day													.5	.080	-.1	1.1
NonSmoker 1994													0(a)	.	.	.

^a This parameter is set to zero because it is redundant.

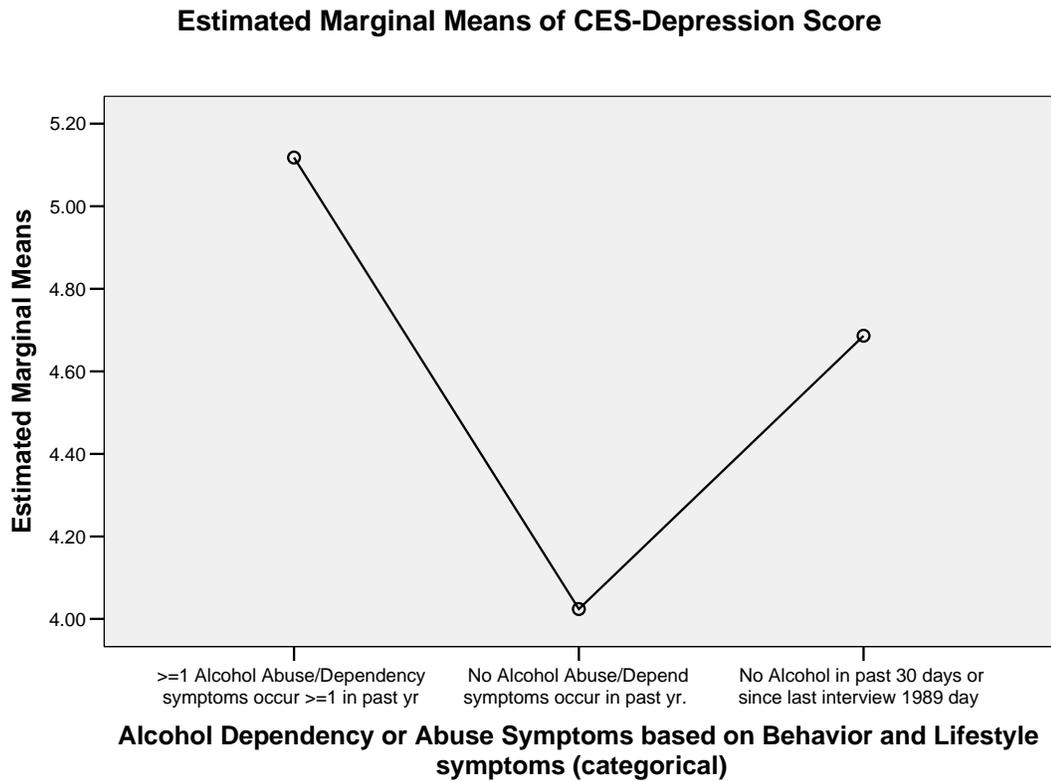


Figure 6.1 Obj. III. Mediator of Alcohol Abuse or Dependency in 1994, for the Simple Model of CES-Depression Scores (CES-D) in 2000 by Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

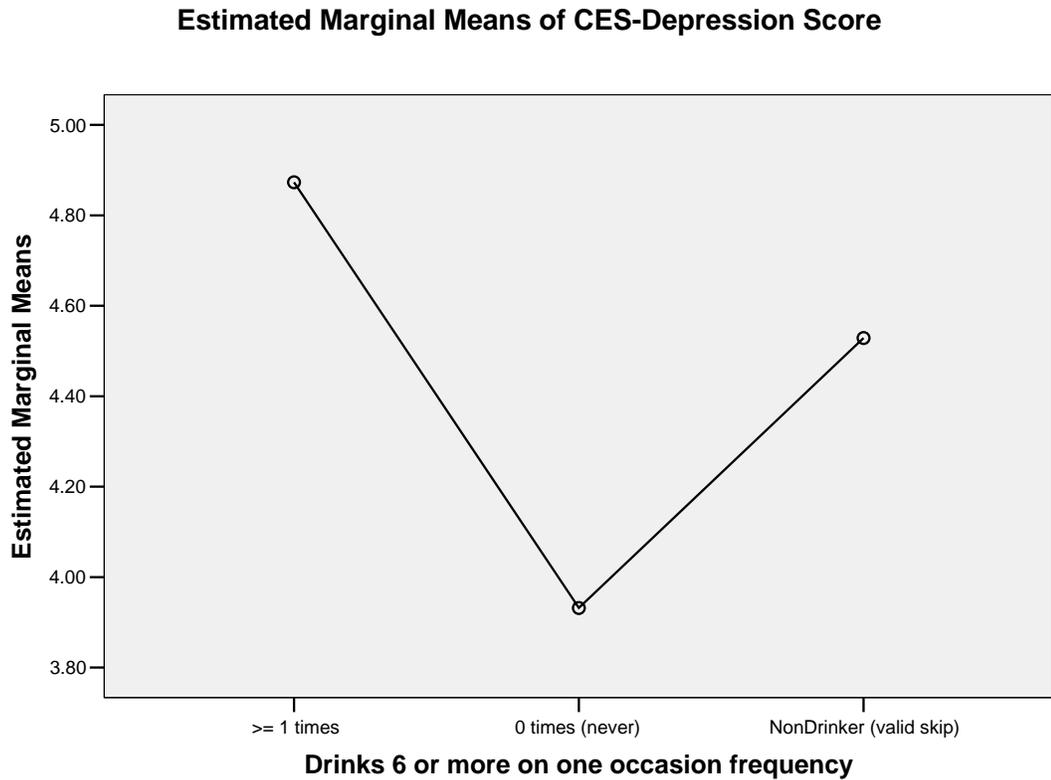


Figure 6.2 Obj. III. Mediator of Heavy Alcohol Drinking in 1994, for the Simple Model of CES-Depression Scores (CES-D) in 2000 by Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

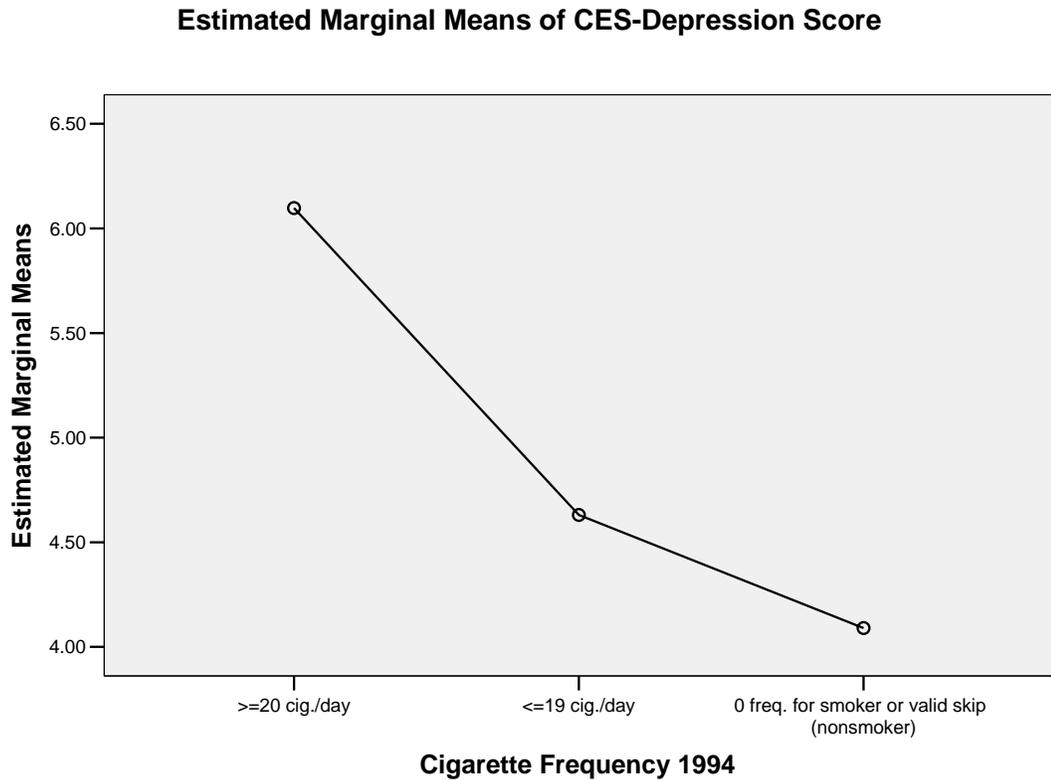


Figure 6.3 Obj. III. Mediator of Cigarette Smoking Frequency in 1994, for the Simple Model of CES-Depression Scores (CES-D) in 2000 by Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

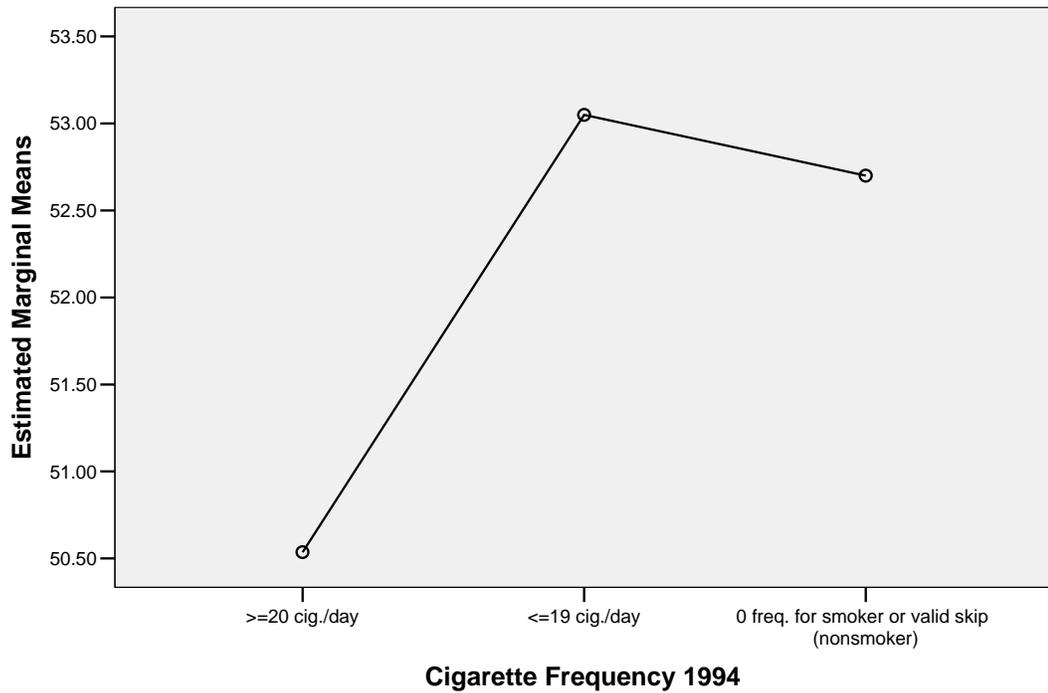


Figure 6.4 Obj. III. Mediator of Cigarette Smoking Frequency in 1994, for the Simple Model of Mental Health Composite Scores (SF-12 MCS) in 2000 by Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

The Effects of Religious Attendance on later Alcohol Abuse or Dependency, Heavy Alcohol Drinking, and Cigarette Smoking Frequency

Objective III.2. Determine whether religious attendance in young adulthood 1982 is protective against (1) alcohol abuse or dependency, (2) heavy alcohol drinking, and (3) cigarette smoking frequency, twelve years later in mid-adulthood, 1994, controlling for other sociodemographic characteristics.

Methods for Objective III.2

Separate multinomial logistic regression models were performed for each of the dependent variables in 1994 of (1) alcohol abuse or dependency, (2) heavy alcohol drinking frequency and, (3) cigarette smoking frequency, by the dependent variable of religious attendance in 1982, controlling for baseline health limitations in 1981 and 1982 sociodemographic characteristics (gender, race/ethnicity, marital status, education, work amount in 1981, net family income in 1981, residence and region).

Results for Objective III.2

The Effects of Religious Attendance on Alcohol Abuse or Dependency

Frequent religious attendance of more than once per week to once per week in young adulthood was found to be protective against alcohol abuse or dependency, controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, work amount, net family income, residence and region (refer to Likelihood Ratio Test, Table 6.6, and the Multinomial logistic regression, Table 6.7). For example, those who reported attending more than once a week in young adulthood had a 70 percent lower odds of being an alcohol abuser twelve years later, compared with those who did not report attending as young adults (OR = 0.29 [0.16,0.53] 95% CI; refer to Table 6.7), while those who reported attending once per week had a 45 percent

lower odds of being an alcohol abuser or dependent twelve years later than nonattenders (OR = 0.55 [0.37, 0.82] 95%CI; refer to Table 6.7). Moderate attendance of one to three times per month was found to be borderline protective ($p=0.064$; refer to Table 6.7). Infrequent attendance was not protective.

Other protective factors against alcohol abuse or dependency at young adulthood included being female, Hispanic or African American, working less than twenty hours per week, and rural residence (refer to Table 6.7).

Predictive factors in young adulthood for being a nondrinker twelve years later included being female, Hispanic or African American, married, working less than twenty hours per week, and rural residence (refer to Table 6.8).

The Effects of Religious Attendance on Frequency of Heavy Alcohol Drinking

Frequent to moderate attendance in young adulthood was protective against heavy alcohol drinking twelve years later, in mid-adulthood, controlling for 1982 sociodemographic variables of gender, race/ethnicity, marital status, education, work amount, net family income, residence and region (refer to the Log likelihood ratio test, Table 6.6, and the Multinomial logistic regression, Table 6.8). A young adult who attended religious services more than once per week to once per month had a 70 to 40 percent lower odds of being a heavy alcohol drinker twelve years later (OR = 0.27 [0.14, 0.50] 95%CI; OR=0.69 [0.48, 0.98] 95%CI; refer to Table 6.8).

Religious attendance of more than once per week to moderate attendance of one to three times per month as a young adult had no affect on whether a person drank alcohol later in adulthood; although infrequent attendance was predictive of later alcohol use (OR=1.42 (1.03, 1.97) 95%CI; refer to Table 6.8).

Other protective factors in young adulthood against heavy alcohol use later in adulthood were being female, Hispanic or African American, working less than twenty hours per week, and rural residence (refer to Table 6.8). Predictive factors in young adulthood of being a nondrinker twelve years later were being African American or Hispanic, married, and a rural residence.

Predictive factors for using alcohol twelve years later were having a higher education level of some high school or more (OR =3.70[1.50, 9.07] 95%CI), and working twenty or more hours per week (OR=1.45[1.09, 1.94] 95%CI; refer to Table 6.8).

The Effects of Religious Attendance on Frequency of Cigarette Smoking

Any amount of religious attendance in young adulthood was protective against heavy cigarette use twelve years later (refer to Log likelihood ratio test, Table 6.6, and the Multinomial logistic regression, Table 6.9). Increasing religious attendance provided increasing protection against heavy cigarette use. Young adults who attended more than once per week had about a 75 percent lower odds of heavy smoking twelve years later compared with nonattenders (OR=0.24 [0.11, 0.50] 95%CI; refer to Table 6.9). Young adults who attended infrequently had a 40 percent lower odds of heavy smoking twelve years later (OR=0.60 [0.43, 0.84] 95%CI; refer to Table 6.9).

Other protective factors during young adulthood against heavy cigarette smoking in later adulthood were being female, African American or Hispanic, never married, not living with children in the household, and rural residence (refer to Table 6.9).

Frequent-to-moderate religious attendance in young adulthood was protective against smoking twelve years later (refer to Table 6.9). Infrequent attendance did not protect against smoking.

Other protective factors against smoking twelve years later were being Caucasian, and not living with children in the household in young adulthood (refer to Table 6.9).

Table 6.6 Obj. III. Multinomial Logistic Regression, Likelihood Ratio Tests. Alcohol Abuse and Dependency 1994, Heavy Alcohol Drinking 1994 and Cigarette Smoking 1994 as Dependent Variables in the Simple Model of Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 1982 Source	Alcohol Abuse/Depend 1994 Dependent Variable			Heavy Alcohol Drinking 1994 Dependent Variable			Cigarette Smoking 1994 Dependent Variable		
	X ²	df	Sig.	X ²	df	Sig.	X ²	df	Sig.
Final Model	215.7	42	.000	299.4	42	.000	208.2	42	.000
Intercept	.0 ^a	0	.	.0 ^a	0	.	.0 ^a	0	.
Religious Attendance 1982	44.1	8	.000	42.6	8	.000	60.7	8	.000
Health Could Limit Amt/Kind Work 1981	.0	2	.984	.3	2	.880	3.2	2	.199
Gender	54.9	2	.000	113.8	2	.000	12.2	2	.002
Race/Ethnicity	20.0	4	.000	24.0	4	.000	55.1	4	.000
Marital 1982	7.4	4	.116	7.2	4	.125	8.0	4	.093
Education 1982	1.7	2	.438	11.3	2	.004	1.3	2	.535
Child # in Household 1982	2.2	4	.695	7.1	4	.130	20.8	4	.000
Work Amount 1981	10.5	2	.005	8.5	2	.014	1.5	2	.463
Net Family Income 1981	4.0	6	.679	3.0	6	.813	3.3	6	.768
Residence 1982	19.4	2	.000	20.5	2	.000	5.2	2	.075
Region 1982	3.9	6	.687	5.2	6	.520	3.9	6	.685
Pseudo R sqr. Cox and Snell	0.111			0.154			0.110		

^a The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Table 6.7 Obj. III. Multinomial Logistic Regression, Parameter Estimates. Alcohol Abuse or Dependency in 1994 as the Dependent Variable in the Simple Model of Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 1982 Parameter	Alcohol Abuse/Depend 1994 Dependent Variable (≥1 Symptoms in past year vs. NonDrinker ^a)					Alcohol Abuse/Depend 1994 Dependent Variable (0 Symptoms in past year vs. NonDrinker ^a)						
	B	df	Sig	OR	CI 95%	B	df	Sig	OR	CI 95%		
Intercept	-.04	1	.928									
Rel. Attend. (RA) 1982 >1/wk	-1.23	1	.000	.29	.16	.53	-.20	1	.416	.82	.51	1.32
RA 1982 1/wk	-.60	1	.003	.55	.37	.82	-.02	1	.911	.98	.67	1.43
RA 1982 1-3x/mth	-.33	1	.063	.72	.51	1.02	.21	1	.227	1.24	.88	1.74
RA 1982 ≤ Sev.x/yr (Infreq.)	.18	1	.258	1.20	.88	1.63	.27	1	.100	1.31	.95	1.82
RA 1982 Not at all (No)	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
1981 Hlh Limits Work Yes	-.01	1	.981	.99	.58	1.71	.04	1	.883	1.04	.62	1.75
1981 Hlh Limits Work No	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Female	-.94	1	.000	.39	.31	.50	-.49	1	.000	.61	.48	.78
Male	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Hispanic	-.41	1	.022	.66	.47	.94	-.38	1	.031	.69	.49	.97
African American	-.56	1	.000	.57	.42	.77	-.54	1	.000	.58	.43	.78
Caucasian and Others	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Marital Status: Div./Wid./Sep. 1982	-.46	1	.093	.63	.37	1.08	-.11	1	.650	.89	.55	1.45
Married 1982	-.23	1	.162	.79	.57	1.10	-.35	1	.031	.70	.51	.97
Never Married 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Education Level: ≥High School 1982	.37	1	.240	1.45	.78	2.70	.29	1	.349	1.34	.72	2.49
< High School 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.

Table 6.7 (Continued).

Independent Variables 1982 Parameter	Alcohol Abuse/Depend 1994 Dependent Variable (≥1 Symptoms in past year vs. NonDrinker ^a)						Alcohol Abuse/Depend 1994 Dependent Variable (0 Symptoms in past year vs. NonDrinker ^a)					
	B	df	Sig	OR	CI 95%		B	df	Sig	OR	CI 95%	
≥2 Children in Household 1982	-.04	1	.860	.96	.62	1.49	-.30	1	.168	.74	.48	1.14
1 Child 82 in Household 1982	.03	1	.856	1.03	.72	1.49	-.11	1	.542	.90	.63	1.28
No Children in Household 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Work Full-Time 1981	.40	1	.008	1.50	1.11	2.02	.42	1	.005	1.52	1.14	2.03
Work Part-Time 1981	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Net Family Income 1981 Missing	.25	1	.207	1.28	.87	1.89	-.04	1	.843	.96	.66	1.40
Net Family Income 1981 Top 25%	.30	1	.129	1.35	.92	1.99	.04	1	.821	1.04	.72	1.52
Net Family Income 1981 Mid 50%	.10	1	.543	1.11	.80	1.53	-.05	1	.731	.95	.70	1.29
Net Family Income 1981 Lowest 25%	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Residence 1982: Rural	-.64	1	.000	.53	.38	.73	-.55	1	.001	.58	.42	.79
Residence 1982: Urban	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Region 1982: West	.30	1	.135	1.35	.91	2.01	.25	1	.205	1.29	.87	1.91
South 1982	.09	1	.611	1.10	.77	1.56	.17	1	.336	1.18	.84	1.67
North Central 1982	.19	1	.299	1.21	.84	1.74	.09	1	.639	1.09	.76	1.56
Northeast 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.

^a The reference category is: No alcohol in past 30 days or since last interview 1989 day (valid skip).

^b This parameter is set to zero because it is redundant.

Table 6.8 Obj. III. Multinomial Logistic Regression, Parameter Estimates. Heavy Alcohol Drinking in 1994 Dependent Variable in Simple Model of Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 1982 Parameter	Heavy Alcohol Drinking 1994 Dependent Variable (>=1 times in past month of >=6 drinks in one occasion vs NonDrinker ^a)					Heavy Alcohol Drinking 1994 Dependent Variable (0 times in past month of >=6 drinks in one occasion vs. NonDrinker ^a)						
	B	df	Sig	OR	CI 95%	B	df	Sig	OR	CI 95%		
Intercept	.29	1	.461									
Rel. Attend.1982 >1/wk (RA)	-1.32	1	.000	.27	.14	.50	-0.31	1	.220	.73	.45	1.20
Rel. Attend 1982 1/wk	-.73	1	.001	.48	.32	.73	.01	1	.978	1.01	.69	1.47
Rel Attend 1982 1-3x/mth	-.37	1	.039	.69	.48	.98	.17	1	.344	1.18	.83	1.68
Rel. Attend 1982<=Sev.x/yr (Infreq.)	.05	1	.779	1.05	.76	1.44	.35	1	.033	1.42	1.03	1.97
Rel. Attend 1982 Not at all (No)	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
1981 Hlh Limits Amt/Kind Work : Yes	.13	1	.652	1.13	.66	1.95	-.01	1	.984	.99	.58	1.70
1981 Hlh Limits Amt/Kind Work : No	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Female	-1.33	1	.000	.26	.20	.34	-.20	1	.122	.82	.64	1.05
Male	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Hispanic	-.40	1	.036	.67	.46	.97	-.49	1	.006	.61	.43	.87
African American	-.46	1	.003	.63	.46	.86	-.67	1	.000	.51	.38	.69
Caucasian and Others	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Marital Status: Div./Wid./Sep. 1982	-.33	1	.235	.72	.42	1.24	-.25	1	.326	.78	.47	1.29
Married 1982	-.25	1	.162	.78	.55	1.10	-.41	1	.011	.66	.48	.91
Never Married 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Education Level: >=High School 1982	.07	1	.811	1.08	.59	1.96	1.31	1	.004	3.70	1.50	9.07
< High School 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.

Table 6.8 (Continued).

Independent Variables 1982 Parameter	Heavy Alcohol Drinking 1994 Dependent Variable (≥1 times in past month of ≥6 drinks in one occasion vs NonDrinker ^a)						Heavy Alcohol Drinking 1994 Dependent Variable (0 times in past month of ≥6 drinks in one occasion vs. NonDrinker ^a)					
	B	df	Sig	OR	CI 95%		B	df	Sig	OR	CI 95%	
≥2 Children in Household 1982	.23	1	.316	1.26	.80	1.98	-.41	1	.070	.66	.42	1.03
1 Child in Household 1982	.19	1	.342	1.21	.82	1.77	-.15	1	.425	.86	.61	1.24
No Children in Household 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Work Full-Time 1981	.38	1	.019	1.46	1.06	2.00	.37	1	.012	1.45	1.09	1.94
Work Part-Time 1981	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Net Family Income 1981 Missing	.24	1	.241	1.27	.85	1.90	-.05	1	.796	.95	.65	1.39
Net Family Income 1981 Top 25%	.24	1	.244	1.27	.85	1.90	.08	1	.659	1.09	.75	1.58
Net Family Income 1981 Mid 50%	.09	1	.598	1.09	.78	1.53	.00	1	.980	1.00	.73	1.36
Net Family Income 1981 Lowest 25%	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Residence 1982: Rural	-.52	1	.002	.59	.43	.82	-.68	1	.000	.50	.37	.69
Residence 1982: Urban	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Region 1982: West	.24	1	.269	1.27	.83	1.92	.27	1	.176	1.31	.89	1.94
South 1982	.12	1	.517	1.13	.78	1.63	.14	1	.438	1.15	.81	1.62
North Central 1982	.24	1	.206	1.28	.87	1.86	.00	1	.994	1.00	.70	1.44
Northeast 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.

^a The reference category is: No alcohol in past 30 days or since last interview 1989 day (valid skip) .

^b This parameter is set to zero because it is redundant.

Table 6.9 Obj. III. Multinomial Logistic Regression, Parameter Estimates. Cigarette Smoking Frequency in 1994 Dependent Variable in Simple Model of Religious Attendance in 1982 (controlling for baseline health limitations in the amount or kind of work one could do for pay in 1981, and sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 1982 Parameter	Cigarette Smoking 1994 Dependent Variable (Smoke >= 1 pack/day vs. NonSmoker ^a)						Cigarette Smoking 1994 Dependent Variable (Smoke < 1 pack/day vs. NonSmoker ^a)					
	B	df	Sig	OR	CI 95%		B	df	Sig	OR	CI 95%	
Intercept	-.75	1	.092				-1.63	1	.001			
Rel. Attend. 1982 >1/wk (RA)	-1.44	1	.000	.24	.11	.50	-1.10	1	.006	.33	.15	.73
Rel Attend 1982 1/wk	-1.12	1	.000	.33	.20	.53	-.85	1	.002	.43	.25	.73
Rel Attend 1982 1-3x/mth	-1.01	1	.000	.36	.24	.55	-.53	1	.017	.59	.38	.91
Rel Attend 1982 <=Sev.x/yr (Infreq.)	-.51	1	.003	.60	.43	.84	.06	1	.773	1.06	.73	1.54
Rel Attend 1982 Not at all (No)	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
1981 Hlh Limits Work Yes	.38	1	.190	1.46	.83	2.57	-.39	1	.323	.68	.31	1.46
1981 Hlh Limits Work No	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Female	-.49	1	.001	.61	.45	.83	.14	1	.391	1.15	.83	1.59
Male	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Hispanic	-1.13	1	.000	.32	.20	.52	.22	1	.340	1.25	.79	1.96
African American	-.81	1	.000	.44	.30	.65	.69	1	.000	2.00	1.39	2.88
Caucasian and Others	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Marital Status: Div./Wid./Sep. 1982	.72	1	.009	2.06	1.20	3.53	.08	1	.792	1.09	.58	2.02
Married 1982	.19	1	.348	1.20	.82	1.77	-.22	1	.303	.80	.52	1.22
Never Married 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Education Level: >=High School 1982	-.38	1	.276	.68	.34	1.36	-.21	1	.598	.81	.37	1.76
< High School 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.

Table 6.9 (Continued).

Independent Variables 1982 Parameter	Cigarette Smoking 1994 Dependent Variable (Smoke \geq 1 pack/day vs. NonSmoker ^a)					Cigarette Smoking 1994 Dependent Variable (Smoke < 1 pack/day vs. NonSmoker ^a)						
	B	df	Sig	OR	CI 95%	B	df	Sig	OR	CI 95%		
\geq 2 Children in Household 1982	.76	1	.003	2.13	1.29	3.51	.11	1	.706	1.11	.64	1.93
1 Child in Household 1982	.82	1	.000	2.28	1.50	3.46	.53	1	.017	1.69	1.10	2.62
No Children in Household 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Work Full-Time 1981	.04	1	.838	1.04	.73	1.48	-.21	1	.238	.81	.57	1.15
Work Part-Time 1981	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Income 1981 Missing	.33	1	.171	1.39	.87	2.24	.13	1	.598	1.14	.70	1.86
Income 1981 Top 25%	.35	1	.142	1.41	.89	2.24	.15	1	.533	1.17	.72	1.88
Income 1981 Mid 50%	.30	1	.132	1.35	.91	1.98	.09	1	.681	1.09	.72	1.66
Income 1981 Lowest 25%	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Residence 1982: Rural	-.40	1	.033	.67	.46	.97	-.21	1	.317	.81	.53	1.23
Residence 1982: Urban	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.
Region 1982: West	-.06	1	.792	.94	.58	1.52	.02	1	.929	1.02	.62	1.69
South 1982	.25	1	.244	1.29	.84	1.97	.12	1	.592	1.13	.73	1.73
North Central 1982	.21	1	.324	1.24	.81	1.89	-.08	1	.746	.93	.58	1.48
Northeast 1982	.00(b)	0	.	.	.	.	.00(b)	0	.	.	.	.

^a The reference category is nonsmoker (valid skip) or 0 freq.

^b This parameter is set to zero because it is redundant.

Conclusion: Summary of Objective III

The behavior factors of alcohol abuse or dependency, frequency of alcohol drinking, and cigarette smoking mediate the relationship of religious attendance in early adulthood to depression in mid-adulthood and, to a lesser extent, the relationship of religious attendance in young adulthood to mental health scores in mid-adulthood.

Increasing religious attendance in young adulthood is a protective factor against alcohol abuse or dependency, and frequency of heavy drinking and smoking.

Objective III Discussion***Justification for use of Mediator vs. Modifier***

There is a debate in the literature as to whether a mediator can also be a modifier between the association of the same independent and dependent variable. According to an article by James and Brett, this is possible, but not according to Barron and Kenney (James & Brett, 1984; Barron & Kenney, 1984).

Theoretically, it is expected that religious attendance influences behaviors, and that behavior influences health. Although alcohol and cigarette smoking are significant modifiers of the effect of religious attendance on depression and mild modifiers for mental health, this study focuses on the theoretical testing of these behaviors to act as mediators in order to contribute to the association between religious attendance and depression and mental health.

Protective Effects of Religious Attendance on Alcohol Abuse or Dependency, Heavy Alcohol Drinking, and Cigarette Smoking

It is interesting to find that religious attendance in young adulthood (ages 22 to 25 in 1982) has no effect on whether people use alcohol twelve years later in mid-adulthood (ages 34 to 37). However, increasing religious attendance in young adulthood is a strong predictor of whether an individual abuses or becomes dependent on alcohol twelve years later.

Another important finding is that only high attendance of once to more than once per week is protective against less frequent episodes of heavy drinking twelve years later. In addition, heavy to moderate smoking in the mid-30s is predicted by religious attendance twelve years earlier.

One hypothesis that might explain the protective effects of increasing attendance in young adulthood against alcohol abuse or dependency and heavy alcohol drinking and cigarette smoking frequency twelve years later in mid-adulthood is that those with no religious attendance in young adulthood use alcohol or smoking as a coping mechanism later in life, while those who are more frequent attenders as young adults find a form of coping through religious participation, which protects them against using other, less-healthy means of coping with the stresses of mid-adulthood. There are no data on religious attendance in 1994, the year that alcohol and smoking factors were measured. It would be interesting to know whether the nonattenders in 1982 remained nonattenders in 1994. If this were the case, then this might support the possible explanation that the nonattenders engaged in risky behaviors to cope in place of participating in religious activities as a means of coping.

Strengths

The theoretical pathways explaining the association between religious attendance and health have not been studied thoroughly. This research attempts to elucidate the mediation of behavior of alcohol abuse or dependency and frequency of cigarette smoking to explain, at least in part, why religious attendance has an influence on health.

The data used in the study comprise a nationally representative dataset; thus the results can be generalized to the U.S. population from which the sample was selected—those in their late teens living in the U.S. during the late 1970s.

Limitations

Very few variables related to lifestyle and behavior could be examined in this study. For example, there were a series of illegal substance use questions, but the frequency of use among those reporting such use was too low, creating unequal variance within categories. Another key theoretical pathway, social support, could not be tested in this study, because of the lack of social support variables available in the dataset.

The mediators were available for multiple years during the eighteen-year gap separating attendance in young adulthood in 1982 from health status in mid-adulthood. As mentioned in Chapter 3, however, the year 1994 was selected because it fell between the years 1982 for attendance and 2000 for health. Alcohol frequency and behaviors are fairly consistent across adulthood, and do not fluctuate widely (E. Wethington, personal communication, 2005).

Another limitation of the study is that the sociodemographic control variables were limited to 1982. Sociodemographic variables of 1994 were not added to the model.

Future Research Recommendations:

Other variables related to alcohol use and smoking may be tested as mediators, such as frequency of “average number of drinks on typical days one does drink within last month” (NLS 2004). The series of questions on alcohol behaviors could be calculated based on the DSM-IV classification for abuse or dependency, as mentioned in Chapter 3. These new variables could be tested for possible mediation as well. Explorations into the protective effects of religious attendance on later alcohol abuse or dependency and frequency of heavy alcohol drinking and cigarette smoking deserve further exploration.

Policy Implications:

Again, it is premature to recommend policy implications based on this research. Future research into mediation may, however, provide insights to those hoping to identify key socio-cultural factors related to religious or spiritual beliefs and practices that contribute to improved health. Once these factors are more clearly identified, mediating factors may be considered as preventative or coping strategies for improved health. The implications of religious participation in young adulthood as a protective factor against later alcohol abuse or dependency, heavy alcohol drinking, and smoking are promising. Further research may shed light on whether health prevention strategies with a religious or spiritual component among youth and young adults may be effective against substance abuse later in life.

CHAPTER 7

Qualitative Framework

The health effects of religious and spiritual beliefs and practices within international humanitarian projects: conceptualization, theory, mediating pathways, practice and policy

Introduction

This section provides a framework for future analysis of exploratory interviews with researchers and professionals at international humanitarian organizations on the influence of religious and spiritual beliefs and practices on mental and physical health, within the context of agency projects. The major themes explored are the conceptualizations of religiousness, spirituality, and mental and physical health, and theorized mediating pathways, field experiences, and institutional policies.

There is growing interest and understanding among researchers of the role that socio-cultural factors, particularly religious and spiritual beliefs and practices, have on mental and physical health, as discussed in the literature review section in Chapter 2. An understanding of these factors may eventually lead to improved mental and physical health within various populations. It is thought that health projects that take into account the socio-cultural beliefs and practices of targeted populations in design, implementation, and evaluation are more effective than projects that do not. Many international agencies lack effective policies with adequate guidelines to enable health projects to account for socio-cultural beliefs and practices. Adequate policies need to be developed within international humanitarian agencies to include adequate and context-specific socio-cultural factors in the design, implementation, and evaluation of health projects.

Justification for Qualitative Research

Viewing the relationship of religiousness and spirituality to mental and physical health from an international perspective is not common; social scientific study of this relationship remains an underdeveloped field within the study of epidemiology of religion (Koenig, personal communication, 2005). Very few studies have examined this topic from a cross-cultural or cross-national perspective within the social sciences. The WHO initiative to include a spirituality, religiousness, and personal beliefs component in the Quality of Life International study is a rare exception (WHOQOL SRPB Group 2005; World Health Organization, 2002a; WHOQOL Group, 1998). Yet it is only a pilot study, the purpose of which is to develop a survey instrument for public use, to study spiritual, religious, and personal beliefs on quality of life. The other main international study is the cross-sectional International Survey of the General Social Survey, which includes questions on individual opinions and beliefs about various issues including social issues such as socioeconomic status, family, and race relations (General Social Survey Series, 2005). Topical modules have been added for certain years to investigate new issues and have included various topics on medical care, religion, religion and health, gender, and cultural issues (General Social Survey Series, 2005). The survey is administered biannually with a unique, independently drawn sample representative of the nations in which it is administered. In 1998 the religion module of the survey was administered in over two dozen countries worldwide, although most of these were located in the Western hemisphere (International Social Survey Programme, 2005).

Objectives and Methods

The objective of the qualitative study is to provide an original analysis of the ways in which spiritual and religious beliefs and practices, as they relate to health, are incorporated in humanitarian projects at international governmental agencies as well

as nongovernmental organizations, in terms of (1) conceptualizations of religiousness, spirituality, and health; (2) hypothesized pathways; (3) field experiences; and (4) policy support and recommendations.

Interview Content Themes

This qualitative research is important in taking an exploratory approach to investigating the most current projects in which international humanitarian and missionary related organizations are involved, in regards to health programs that have a religious/spiritual component. The main themes explored are described below. A summary and more detailed interview guide and consent form are shown in Appendix C.

(1a) Theories of religiousness/spirituality and health, on which health projects are based;

(1b) Experiences/outcomes of the projects, reinforcing the theories;

(2) Policy implications at the national and international level for supporting or not supporting health projects that have a religiousness/spirituality component;

(3) Future recommendations for or thoughts about international health projects with a religious/spirituality component: What is needed for the future in terms of policies, resources, cooperation, and research?

Because each agency has its own background philosophies, goals, and objectives, and because projects with religiousness/spirituality components exhibit a wide range of

diversity across agencies, it was important to inquire about the following background information at the beginning of each interview:

(4) Philosophy, the mission of the agency, including goals and objectives;

(5a) Types of health projects with a socio-cultural component, including the religious or spiritual beliefs of target populations;

(5b) History, implementation and evaluation (successes and weaknesses of such programs);

(6) Determining which types of health projects are most and least benefited by the incorporation of a spirituality/religiousness component.

It was important to inquire about the professional background and experiences of each interviewee:

Professional Position

Responsibilities

Experiences/Background in international humanitarian work and health programs with a spirituality/religiousness component.

The interviews included both fixed questions, such as those listed above, and flexible questions, depending on the types of responses that arose during interviews. In addition, the order of the questions was both fixed and flexible. The order followed the described outline above, but was frequently adjusted to the type and nature of interviewee responses.

Each interview was approximately one hour in length (ranging from a half hour to three hours in length) and was audio taped with the prior permission of the interviewee. Also, handwritten notes were taken during each interview by the interviewer.

Sample Selection

The sample to be interviewed was selected by the use of a convenient sample. The professionals who were selected for interview requests included personnel at governmental and nongovernmental international humanitarian organizations, some of which are secular and some of which have a religious affiliation. Researchers at universities were also interviewed. Additional interviewees were contacted as a result of recommendations offered during the initial and follow-up contacts. Additional follow-up questions or issues to be addressed were clarified through follow-up interviews via telephone or e-mail.

Confidentiality

Confidentiality was addressed while informing each interviewee before the initial interview, via e-mail, of the nature of the questions, the purpose of the interview, and its confidentiality. Interviewees were given the option of keeping their identifying information confidential.

Human Subject Approval

Approval by the Cornell University Human Subject Review Committee was obtained for qualitative interviewing of researchers, policy makers, and other professionals involved in health research/programs at the international humanitarian agencies and universities. The request was submitted and approved before the research commenced.

Qualitative Research Description

For approximately two months, interviews were conducted with researchers, policy makers, and other professionals at international humanitarian organizations and universities. Other professionals at secular and faith-based nongovernmental organizations (NGOs) were also contacted. Leaders of faith-based missions that focus on international health projects were also interviewed.

Methods

Since an international secondary dataset with adequate religious and spiritual and health variables was not found for analysis, it was decided to conduct exploratory qualitative interviews primarily with researchers at international humanitarian organizations involved in health projects in which the socio-cultural component was thought to be important. The exploratory interviews investigate the theoretical conceptualizations and pathways involved in explaining the relationship of socio-cultural beliefs and practices to health. Field experiences informing the theories and policies of the organizations that are supportive of these socio-cultural beliefs in design, implementation, and evaluation were also included in the qualitative interviews.

A semi-structured, open-ended interview guide was developed to provide in-depth analysis of the knowledge acquired about participants' experiences related to the themes of the interviews. The summary outline of the interview guide is provided along with the consent form (refer to Appendix C).

This qualitative inquiry provides a descriptive, exploratory, and inductive opening-up of new ideas and information on religiousness and spirituality in relation to health in the international humanitarian arena (Miles & Huberman, 1994). The qualitative in-

person interviews provide credible anecdotal evidence at the international level for a deeper understanding of “complex real-world contexts” contributing to the theoretical and quantitative sections of the dissertation (Miles & Huberman, 1994).

The agencies from which interviewees were selected feature humanitarian projects that are directly or indirectly related to health. Approximately 30 in-person interviews, of approximately one hour each, have been conducted with representatives of various governmental and nongovernmental organizations. Other sampling methods employed in finding and identifying potential interviewees include the opportunistic or chain effect, based on recommendations from initial agency contacts (Miles & Huberman, 1994).

During data collection and prior to analysis, participants were contacted (in what sociologists term “member checks” for confirmability of findings) to discuss emerging themes with the researchers, to solicit their input for the interpretation of the data, and if necessary to provide clarification or correction of the information provided during the initial interviews (Miles & Huberman, 1994). These methods increase the objectivity of the findings (lessening the effects of researcher bias), and improve the validity of the study.

The audio taped interviews and field notes were transcribed verbatim and checked for accuracy. Several persons were hired to assist with transcription.

Next, the analysis will be based on grounded theory, attempting to identify categories and concepts that emerge from the text and linking these concepts with the theory (Denzin & Lincoln, 2003). The main and recurring themes, concepts, and issues found

from the transcribed interviews will be categorized. The themes and concepts are to be compared and contrasted, using the technique of the constant comparison method (Denzin & Lincoln, 2003). From the themes and concepts that emerge from the data, a conceptual model will be formulated for the definitions and the role of religion and spirituality in relation to health (including hypothesized mediating pathways to explain this relationship, and field experiences that inform the theory and policies), within the context of international projects.

The analysis will use the qualitative software program ATLAS to assist with the organization of the transcribed material.

Summary

This exploratory qualitative framework and future analysis will contribute by providing a current overview of the ways in which socio-cultural beliefs and practices, particularly spirituality and religiousness, within the context of health projects, are conceptualized and utilized in the field and through policies of international humanitarian organizations.

CHAPTER 8
Conclusion of Dissertation

Summary of Findings

from the Three Sections of Literature Review, Quantitative Analysis and the Qualitative Framework

Literature Review and Key Pathways

The first section of this dissertation provides a background literature review, conceptualizations of religiousness and spirituality, and hypothesized theoretical pathways and mediating factors for explaining the relationship of spiritual and religious beliefs and practices to health.

Four key regrouped pathways to explain how religiousness and spirituality affect health

This section identified and recategorized four key pathways for explaining how religious and spiritual beliefs and practices influence health outcomes, from among a series of possible pathways proposed by Levin (1996). These four categorized pathways are (1) the Behavior and Lifestyle Pathway; (2) the Social Support Pathway; (3) the Psychodynamics of Ritual, Belief, and Faith Pathway; and (4) the Multifactorial Pathway.

Salutogenic model of the positive impact of religious beliefs and practices on health

The salutogenic model of health proposed by Antonovsky provides a framework for conceptualizing positive health outcomes as an alternative to the pathogenic model that is prevalent in most medical models.

Need to consider the negative impact of religious beliefs and practices on health

Religious participation may not always have a positive impact on health. A review of negative studies provides a more balanced perspective on the potential negative health effects of religious beliefs and participation.

Quantitative Analysis

Objective I

The second section of the dissertation provides a quantitative analysis examining the cross-sectional relationship in the year 2000 of religious participation to mental and physical health and depression and the mediating pathway of behavior and lifestyle, among those 40 to 43 years of age, utilizing data from the National Longitudinal Survey of Youth 79 (NLSY79).

U-shaped curvilinear relationship of religious attendance to physical health

The main findings of this research for Objective I have developed from examining the relationship between religious attendance and physical and mental health and depression in 2000. A positive U-shaped curvilinear relationship across religious attendance levels and physical health in the year 2000 has been found, controlling for gender, race, marital status, education, number of children living in the household, work amount, and income. Moderate to infrequent attendance levels (of one to three times per month to several times a year or less) were related to better physical health scores, while higher attendance levels of once to more than once per week or no attendance were related to lower physical health scores.

Religious attendance for low SES associated with better physical health scores

Some attendance among those of low SES (low education, or low work amount, or low income) was associated with better physical health compared with no attendance.

For those of higher SES, religious attendance made very little difference in physical health scores.

African Americans were shown to have better mental health and less depression with higher attendance levels

African Americans with higher attendance levels reported better mental health scores and lower depression scores, compared with no attendance, controlling for the sociodemographic variables listed above (gender, marital status, education, number of children living in the household, work amount, and income). In contrast, Caucasians and others showed the reverse trend: lower mental health and higher depression scores with increased attendance, and better mental health and lower depression scores with no attendance. Hispanics fluctuated in mental health and depression scores across various levels of attendance.

Objective II

Objective II examines the relationship of early adulthood attendance in 1982 to physical health, mental health and depression in 2000, controlling for baseline health limitations in 1981, and sociodemographic control variables of gender, race/ethnicity, marital status, education level, number of children living in the household, residence, and region. The key findings are listed below.

Attendance as young adult in 1982 was predictive of better mental health and less depression in 2000

Early attendance in young adulthood was positively associated with better mental health and less depression in middle adulthood, controlling for baseline health limitations in 1981, and 1982 sociodemographic factors previously mentioned. Even after controlling for both the 1982 (previously mentioned) and the 1998

sociodemographic variables of marital status, number of children living in the household, net family income, work amount, and residence, there was still a significant relationship between young adulthood attendance in 1982 and better mental health and less depression in 2000.

Religious affiliation of some kind in young adulthood in 1982 was predictive of better physical health and lower depression in 2000, compared with no affiliation in 1982

Religious affiliation in young adulthood was associated with mid-adulthood physical health and depression (without the presence of attendance 1982), and controlling for 1981 baseline health limitations and the 1982 sociodemographic variables previously mentioned. Those with no affiliation in young adulthood reported the poorest physical health and highest depression scores in mid-adulthood.

Being of the Jewish faith in 1982 was predictive of better physical health and lower depression in mid-adulthood in 2000

Those who were affiliated with the Jewish faith as young adults had the highest physical health and lowest depression scores in mid-adulthood, controlling for the 1982 sociodemographic variables listed above. There were only approximately twenty respondents with this affiliation, so the results may not be reliable.

Consistent moderate attendance of one to three times per month from 1982 to 2000 was associated with better physical health, better mental health and lower depression in 2000. Decrease in attendance over time was also associated with better health in 2000

No change in moderate attendance of one to three times per month from 1982 to 2000 was associated with better physical health, mental health and low depression scores in mid-adulthood. The general trend was that no change or constant attendance (ranging

from more than once per week to infrequent attendance) from 1982 to 2000 was associated with better health in 2000, compared with those who changed in attendance. Those who reported a decreased attendance also reported better health.

Objective III

Cigarette Smoking in 1994 found to be a complete mediator of relationship between religious attendance 1982 and mental health and depression in 2000

Frequency of cigarette smoking was a complete mediator of the relationship between religious attendance and depression and mental health. Those who attended religious services in young adulthood in 1982 were less likely to engage in heavy or moderate smoking in 1994. There was a linear relationship between increasing religious attendance, and lower odds of cigarette smoking frequency. Likewise, increasing frequency of cigarette smoking in 1994 was related to higher depression scores in 2000.

Alcohol abuse and dependency found to be a mild partial mediator of the relationship between religious attendance and depression

Alcohol abuse and dependency showed evidence of mild partial mediation for religious attendance and depression.

Alcohol Drinking found to be a very mild partial mediator of the relationship between religious attendance and depression

Heavy alcohol drinking was not a significant mediator; only whether an individual used alcohol or not was found to be a mediator.

There was no evidence of mediation for any of the potential mediators of alcohol abuse and dependency, heavy alcohol drinking, or cigarette smoking frequency for the relationship between religious attendance 1982 and physical health 2000.

Attendance as a young adult in 1982 was protective against engaging in risky behaviors of heavy alcohol drinking, smoking, or alcohol abuse and dependence in 1994

Respondents with higher attendance levels as young adults were less likely to engage in such risky behaviors as alcohol abuse and dependency, heavy alcohol drinking, and smoking, controlling for 1982 sociodemographic variables of gender, race/ethnicity, marital status, education, work amount, income, residence, region, and baseline health status 1981. Religious attendance was a strong predictor of later alcohol abuse and dependency, heavy alcohol drinking, and smoking. Infrequent attendance in young adulthood was not protective against the behaviors of alcohol abuse or dependency or heavy alcohol drinking in mid-adulthood. However, infrequent attendance in young adulthood was protective against heavy smoking in mid-adulthood.

Attendance as a young adult in 1982 was not found to affect or influence alcohol drinking in 1994.

Qualitative Exploration

Development of framework for qualitative analysis

To further investigate the relationship of religiousness and health at the international humanitarian organizational level, the last section of the dissertation develops a qualitative framework. Exploratory interviews with researchers and professionals at international humanitarian organizations were conducted on the influence of spiritual and religious beliefs and practices on health, within the context of agency projects.

Major themes explored were the following: conceptualization of spirituality, religiousness and health; theorized mediating pathways; field experiences; and institutional policies. The interviews will be analyzed in the future.

Many international agencies lack effective policies with adequate guidelines to enable health projects to account for the socio-cultural beliefs and practices of the population being served. It is believed that the development of more adequate policies within international humanitarian agencies to include socio-cultural factors (such as religious or traditional beliefs and practices) in the design, implementation, and evaluation of health projects would help to make implemented health projects more effective. This qualitative research will explore this current thinking.

Study Strengths and Other Studies' Findings

Quantitative Analysis

National longitudinal datasets that include adequate variables for both religiousness and health are not common, as most national datasets are cross-sectional. Despite the inherent limitations of using this secondary dataset of the NLSY79, this study is among the few of which the author is aware that investigates the association of religious attendance and self-reported physical health, mental health, and depression cross-sectionally, over time, and testing of the mediating theoretical pathways of behavior/lifestyle by using such a dataset. Another study by Hummer, published in 1999, examined the relationship between religious attendance and reduced risk of mortality over a nine-year follow-up period, using a nationally representative sample of U.S. adults (Hummer, Rogers, Nam, & Ellison, 1999). The data were obtained from the National Health Interview Survey and linked to later mortality data. The study results showed that people who attended religious services more than once per week had an additional seven years in life expectancy at age 20 compared with those who

never attended (Hummer et al., 1999). This study found a relationship between religious participation and reduced mortality, using national U.S. data. The distinguishing contribution of this dissertation to the literature is that it examines, cross-sectionally and over time, the relationship of religious participation to self-reported physical health, mental health and depression, from well-validated health outcome measures of the SF-12 items and the CES-Depression scale, from a nationally representative sample of adults in the United States. The study also tests the mediating pathway of behavior of cigarette frequency, alcohol abuse or dependency and heavy drinking, to help explain how religious participation may affect health outcomes.

Studies using national data from other countries have examined the relationship between religious participation and various health outcomes. For example, a national longitudinal study in the Netherlands among older Dutch citizens found that religious attendance was associated with fewer depressive symptoms over a six-year period (Braam et al., 2004). A cross-sectional national Canadian study on spiritual and religious involvement and depressive symptoms found that those with higher levels of attendance reported fewer depressive symptoms, controlling for demographic, social and health variables (Baetz et al., 2004).

This dissertation research has explored interactions between religious attendance and change in attendance with sociodemographic variables (including race/ethnicity, education, number of children living in the household, work amount, and net family income), as well as with baseline health limitations and the subsequent interaction effects across scores for physical health, mental health and depression. The present study provides evidence that different groups, such as those of low socio-economic status, and African Americans, interact with religious attendance in different ways.

Religious attendance may serve different purposes among different groups. For example, the justification for hypothesizing the interaction of ethnicity and education with attendance to predict mental and physical health outcomes is found in previous research, which has shown that ethnicity, education levels, and number of children are independently related to physical and mental health outcomes (Rodriguez, Allen, Frongillo, & Chandra, 1999). There is also some evidence that the determinants of depression differ among Caucasians and African Americans (Rodriguez et al., 1999).

Other studies have investigated relationships between religiousness and health among African Americans. A study on religion, race/ethnicity, and self-reported health among Caucasians, African Americans and Hispanics living in low socio-economic status neighborhoods in Texas found that African Americans reported lower mental health scores and self-rated health (Franzini, Ribble, & Wingfield, 2005). However, being African American was indirectly associated with better mental health through religious participation, but indirectly associated with poorer mental and physical health with non-organized religiousness, measured by frequency of prayer and importance of beliefs (Franzini, Ribble, & Wingfield, 2005).

Another study, conducted among older men, found that African Americans reported fewer depressive symptoms, which was strongly associated with religious coping (Koenig et al., 1992; Taylor, Chatters, & Levin, 2004). An article by Levin, Chatters, and Taylor reviews many studies on religion and health among African Americans and concludes that most studies show a protective effect of religiousness against depressive symptoms and psychological distress (Levin, Chatters, & Taylor, 2005).

The findings of this current research project—that attendance protects against risky behaviors of alcohol and cigarette smoking behaviors—further substantiate other findings within the literature on this topic (Whooley et al., 2002; Koenig et al., 1994). For example, a study by Whooley et al. (2002) found that young adults who attended religious services reported lower rates of cigarette use, with lasting effects up to three years later. Koenig, McCuollough, and Larson reviewed a number of studies that have shown consistently that more frequent religious attendance, as well as private religious practices, and religious importance, were all predictors of decreased alcohol and drug use among adults and adolescents (Koenig et al., 2001).

Qualitative Exploratory Framework

Little research has been conducted on how international humanitarian organizations take into account the spiritual and religious beliefs and practices of targeted populations of particular health projects. Similarly, little research has been developed from an international perspective on the relationship between beliefs and health outcomes. This exploratory qualitative framework serves as an initial exploration of current thinking and practices within international humanitarian organizations pertaining to the relationship between beliefs and health within the context of their research, health projects, and populations being served by these health projects.

Study Limitations

Quantitative Analysis

The limitations of the data used in this quantitative analysis include having a small number of religious and physical and mental health variables available for only a few years during the 25-year duration of the study.

Another limitation of this study, and other studies on the effects of religious participation on health, is the problem of self-selection bias (Sloan, 2005; Hummer et al., 1999). Selection bias is a common problem for most observational studies. People who attend religious services more often may differ demographically from those who do not (Hummer et al., 1999). To account for these potential differences, the analysis controlled for the sociodemographic variables of gender, race/ethnicity, education, marital status, number of children living in the household, work amount, net family income, region, and type of residence (urban or rural).

Another possible source of self-selection bias is the difference in health status between attenders and non-attenders. For the cross-sectional data in objective I, it is unclear whether those who do not attend religious services are composed of a large number of individuals who are too ill to be able to attend. Likewise, for those who attend frequently, it is unclear whether these individuals are ill and thus attending religious services to be able to cope. This may explain the U-shaped trend in religious attendance in the data for the physical health outcome. Those at the two extremes of attendance, high attendance of more than once per week and no attendance, report the lowest physical health scores, while those of moderate attendance report the best physical health scores. This self-selection bias is reduced to some degree in that the data uses non-institutionalized individuals (Hummer et al., 1999). Thus it excludes some of the least healthy or mobility-limited adults from the study.

Religious attendance may simply be an indicator of a healthier status rather than a cause of better health (Bagiella, Hong, & Sloan, 2005). Those individuals who choose to attend religious services may simply be healthier than those who do not attend (Bagiella et al., 2005). They may exhibit or possess other characteristics that promote

their health. Attendance at religious services may be a result of their better health from other causes, not necessarily from religious participation. For example, they may be more socially involved in the community, not just in religious services, or they may lead healthier lifestyles, of which religious participation is a result and not necessarily a cause.

The Objective II longitudinal model attempted to reduce selection bias. The model examined the relationship between change in religious attendance over time from 1982 to 2000 to later physical health, mental health, and depression scores in 2000, and attempted to control selection bias by controlling for baseline “health limitations in the amount or kind of work a respondent could do for pay in 1981.”

Those individuals who reported an increase in attendance also reported lower scores for physical health, mental health, and higher depression, compared with those who reported no change in attendance over time. Those individuals who reported an increase in attendance over time may have experienced an illness which prompted them to increase participation as a coping strategy. Controlling for baseline health limitations in 1981, the year before the 1982 religious participation was measured, helps to lessen the possible effects of selection bias.

Another limitation of this research and other studies on religious participation and health is the problem of residual confounding (Sloan, 2005). The models in this study do not control for participation in other community activities. Religious participation itself may not be the only factor associated with the observed mental and physical health outcomes. Rather it may be a part of a broader concept of “engagement in the

community and social activities” that is associated with better mental and physical health outcomes (Sloan, 2005, p. 2).

Qualitative Analysis

The qualitative exploratory research provides a framework for future analysis of the conducted interviews. This sample may not be representative of international humanitarian organizations because of the use of a convenient sample formed through previous contacts and the chain effect of sample selection.

Future Recommendations

Other suggestions to build on the findings of the present research include studying the effects of religious attendance among different groups separately. A combination of quantitative and qualitative research pertaining to different groups may provide insights into the nature of interactions with SES, race/ethnicity, and marital status. It would be interesting to examine different age groups to see if similar effects are found, using different cohorts of the National Longitudinal Survey, such as the children of the mothers of the NLSY79.

Future research possibilities include expanding upon the qualitative interviews to be more inclusive of other international agencies, not just a select few, to learn how religious and spiritual belief and practices in relation to health are understood by international humanitarian organizations, in conceptualizations, field experiences and policies. It would also be interesting to conduct focus groups and individual interviews with people from various faith and cultural backgrounds to obtain a deeper understanding at the individual and group level of personal, cultural, and religious beliefs and practices to understand better how each perceives its impact on individual mental and physical health.

Possible Policy Implications of the Research

Overall possible tentative policy implications based on the findings of this study are suggested. It should be stressed that these are only potential policy implications, based on these study findings alone.

Preventative and therapeutic physical and mental health community programs may find it effective to collaborate with religious organizations to promote better health, particularly for the marginalized of society, among the poor (those of low socio-economic status), minorities (particularly African Americans), and among young adults. The quantitative research findings suggest that religious participation has physical and mental health benefits, particularly for these groups of society. Those of low socio-economic status who attended religious services reported better physical health scores than those of low socioeconomic status who did not attend. Participation among African Americans was associated with lower depression scores compared with the experiences of other ethnicities and races. Religious participation in young adulthood showed evidence of a protective effect against engaging in risky behaviors of alcohol abuse or dependency, and heavy drinking twelve years later. In addition, the results show that even infrequent attendance confers health benefits compared with non-attendance.

Participation may reduce the stressors that these often marginalized groups of society—the poor, African Americans, and young adults—uniquely face. Participation may promote opportunities for social support and coping strategies. Further studies investigating the relationship between religious participation and mental and physical health outcomes are recommended to substantiate the findings before any policies are

implemented. Before these policy recommendations are implemented in a large-scale national setting, they should be tested in smaller, localized pilot programs.

There are potential long-term applications of this quantitative research and future qualitative research. From an improved understanding of the relationship between religiousness and mental and physical health, national or international humanitarian health projects with a religious or spiritual component could possibly be developed for a more integrative and long-lasting impact on the health of the populations being served. Spiritual and religious beliefs and practices are often integral to the lives of those who are marginalized within society. Health projects which take into account the religious and spiritual beliefs and practices of the targeted population may be more effective in their mission of health care and prevention.

APPENDIX A
Quantitative Results
Objective One

Table A.1 Obj. I. ANOVA (Tests of Between Subject Effects) Simple, One Two-way Interactions and Full Model (Three-Two-way and Two Three-way Interactions) of Religious Attendance in 2000 interacting with Education in 2000, Work Amount in 1999 and Income in 1999 on Physical Health Composite Score in 2000 (SF-12 PCS; controlling for sociodemographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1999 and net family income in 1999).

Models		Simple			1 2-way Educ.* Rel. Attend			1 2-way Work *Rel. Attend			1 2-way Incom. *Rel. Attend			Full Model 3 2-way Int.			Full Model 2 3-way Int.		
Source Independent Var.	df	F	Sig	df	F	Sig	df	F	Sig	df	F	Sig	df	F	Sig	df	F	Sig	
Corrected Model	18	21.8	.00	26	15.8	.00	22	18.7	.00		14.1	.00	42	10.9	.00	83	6.5	.00	
Intercept	1	13914.4	.00		13547.3	.00		13932.4	.00		13894.0	.00		13574.6	.00		10811.0	.00	
Religious Attendance 2000	4	2.0	.09		4.8	.00		5.6	.00		2.3	.05		6.4	.00		6.7	.00	
Gender	1	2.2	.14		1.9	.16		2.6	.10		1.9	.17		1.9	.17		3.2	.07	
Race/ethnicity	2	2.1	.13		1.9	.14		2.2	.11		2.0	.13		1.9	.15		1.4	.26	
Marital Status 2000	3	1.0	.38		1.1	.36		.8	.51		1.1	.34		1.0	.38		1.4	.24	
Education 2000	2	4.0	.02		4.5	.01		3.8	.02		3.7	.02		3.4	.03		2.6	.08	
Child # living in househld. 2000	2	4.9	.01		5.1	.01		5.0	.01		4.9	.01		5.1	.01		4.0	.02	
Work Amount 1999	1	170.3	.00		169.5	.00		179.4	.00		166.5	.00		166.2	.00		127.0	.00	
Net Family Income 1999	3	11.3	.00		11.4	.00		11.5	.00		14.9	.00		14.4	.00		8.0	.00	
Rel. Attend * Education				8	2.2	.02								1.9	.06		2.5	.01	
College/Grad (>HS)					0.9	.89								3.0	.02				
High School (HS)					1.0	.43								2.7	.03				
None/Grammar (<HS)					4.6	.00								4.7	.00	4			
Rel. Attend * Work Amount							4	4.4	.00					3.4	.01		2.9	.02	
0 – 20 hrs/wk (PT)								.3	.89					2.3	.06				
>20 ->40 hrs/wk (FT)								6.2	.00					7.2	.00	1			

Table A.1 (Continued).

Models		Simple			1 2-way Educ.* Rel. Attend			1 2- way Work* Rel. Attend			1 2- way Incom. *Rel. Attend			Full Model 3 2- way Int.			Full Model 2 3- way Int.	
Source Independ. Var. 2000	df	F	Sig	df	F	Sig	df	F	Sig	df	F	Sig.	df	F	Sig.	df	F	Sig
Rel. Attend * Income										12	2.3	.01		2.1	.01		0.5	.91
Missing											3.9	.00		5.1	.00			
Top 25% (>=\$70,000)											.2	.93		2.7	.03			
Mid 50% (\$ >=20,600 >=69800)											.7	.60		5.1	.00			
Lowest 25% (<=\$20,516)											3.9	.00		5.3	.00			
Rel. Attend*Work*Income																15	2.5	.00
FT * Missing																	.92	.45
FT * Top 25%																	1.7	.16
FT* Mid 50%																	1.5	.21
FT* Lowest 25%																	.8	.53
PT* Missing																	1.9	.11
PT*Top 25%																	1.4	.24
PT*Mid 50%																	3.3	.01
PT*Lowest 25%																	3.0	.02

Table A.1 (Continued).

Models	Simple			1 2-way Educ.* Rel. Attend			1 2-way Work *Rel. Attend			1 2-way Incom.*Rel. Attend			Full Model 3 2-way Int.			Full Model 2 3-way Int.			
	df	F	Sig.	df	F	Sig.	df	F	Sig.	df	F	Sig.	df	F	Sig.	df	F	Sig.	
Independent Variables 2000																			
Rel. Attend*Educ.*Income																26	1.4	.08	
>HS*Missing																	1.0	.42	
>HS*Top 25%																	1.1	.37	
> HS*Mid 50%																	1.7	.15	
>HS*Lowest 25%																	2.0	.09	
HS*Missing																	5.8	.00	
HS*Top 25%																	1.0	.41	
HS* Mid 50%																	1.3	.29	
HS*Lowest 25%																	5.1	.00	
<HS*Missing																	1.6	.18	
<HS*Top 25%																	.	.	
<HS*Mid 50%																	2.1	.08	
<HS*Lowest 25%																	1.9	.12	
Error	2055			2047	2055			2051			2043			2031			1990		
Total	2074			2074	2074			2074			2074			2074			2074		
Adj. R Squared	0.153			0.157				0.158			0.159			0.167			0.180		

Table A.2. Obj. I. Simple, (One Two-way Interactions and Full Model (Three Two-way) Interactions of Religious Attendance in 2000 interacting with Education, Work and Income on Physical Health Composite Score (SF-12 PCS) in 2000 (controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in the household, work and income).

Dependent Variable: PCS2000 SF-12 PCS 2000

Models	Simple				1 2way Interaction of Education *Religious Attendance				1 2-way Interaction of Work Amount*Religious Attendance				1 2-way Interaction of Net Family Income*Religious Attendance				3 2-way Interact. Educ. * Rel. Attend, Work * Rel. Attend, Inc. * Rel. Attend			
	B	Sig.	CI		B	Sig.	CI		B	Sig.	CI		B	Sig.	CI		B	Sig.	CI	
Intercept	43.4	.00	40.9	45.8	36.0	.00	30.5	41.5	40.0	.00	36.9	43.1	40.2	.00	37.0	43.3	32.4	.00	26.6	38.2
Rel. Attend >1/wk	.2	.73	-1.1	1.5	8.9	.01	2.2	15.6	2.8	.05	-0.1	5.6	4.9	.00	2.2	7.6	12.5	.00	5.5	19.5
Rel. Attend 1/wk	1.1	.09	-0.2	2.3	5.3	.11	-1.2	11.8	5.0	.00	2.2	7.8	4.9	.00	2.2	7.5	9.9	.01	3.0	16.7
Rel. Attend 1-3/mth	1.1	.07	-0.1	2.4	12.7	.00	6.1	19.3	5.3	.00	2.4	8.2	3.5	.01	.7	6.2	15.9	.00	8.9	22.9
Rel. Attend <=Sev.x/yr (Infreq.)	1.4	.04	0.1	2.6	10.7	.00	4.0	17.3	6.4	.00	3.5	9.2	4.1	.01	1.1	7.1	15.0	.00	7.9	22.2
Rel. Attend Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-.5	.14	-1.2	0.2	-.5	.16	-1.2	.2	-.6	.10	-1.3	.1	-.5	.17	-1.2	.2	-.5	.17	-1.2	.2
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	-.9	.05	-1.9	-.02	-.9	.06	-1.8	.0	-1.0	.04	-1.9	-.05	-.9	.05	-1.8	.0	-.9	.06	-1.8	.0
African American	-.4	.30	-1.3	.4	-.5	.28	-1.3	.4	-.4	.29	-1.3	.4	-.5	.27	-1.3	.4	-.5	.27	-1.3	.4
Caucasian & others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Widowed/Separated	-1.0	.20	-2.5	.5	-1.0	.20	-2.5	.5	-.9	.26	-2.4	.6	-1.0	.20	-2.5	.5	-1.0	.19	-2.5	.5
Divorced	-.7	.24	-1.9	.5	-.7	.23	-1.9	.5	-.6	.30	-1.8	.5	-.9	.14	-2.0	.3	-.8	.17	-2.0	.4
Married	-.1	.86	-1.2	1.0	-.1	.91	-1.1	1.0	-.1	.85	-1.2	1.0	-.2	.66	-1.3	.8	-.3	.64	-1.3	.8
Never Married	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
> High School (HS)	1.5	.13	-.5	3.5	9.3	.00	3.7	14.8	1.4	.16	-.6	3.3	1.6	.11	-.4	3.5	7.7	.01	2.1	13.3
High School	.5	.60	-1.4	2.4	7.9	.01	2.4	13.5	.4	.66	-1.5	2.3	.7	.50	-1.3	2.6	7.3	.01	1.6	12.8
< High School	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table A.2 (Continued).

Models	Simple				Interaction of Education *Religious Attendance				Interaction of Work Amount*Religious Attendance				Interaction of Net Family Income*Religious Attendance				3 2-way Interaction of Educ. * Rel. Attend, Work Amt. * Rel. Attend, Income * Rel. Attend			
	B	Sig	CI		B	Sig	CI		B	Sig	CI		B	Sig.	CI		B	Sig.	CI	
Independent Variables 2000																				
>=2 Children	1.0	.03	.1	1.9	1.0	.03	.1	1.9	1.0	.02	.1	1.9	1.0	.03	.1	1.9	1.1	.02	.2	1.9
1 Child	-.4	.47	-1.4	.7	-.4	.47	-1.4	.6	-.3	.51	-1.4	.7	-.4	.50	-1.4	.7	-.3	.57	-1.3	.7
No Children	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work>20 hrs/wk (FT)	6.1	.00	5.2	7.0	6.1	.00	5.1	7.0	10.4	.00	7.8	12.9	6.0	.00	5.1	6.9	9.0	.00	6.3	11.7
0-20 hrs/wk (PT)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income Missing	2.1	.00	.9	3.2	2.1	.00	1.0	3.2	2.0	.00	.9	3.2	7.0	.00	3.7	10.3	6.5	.00	2.8	9.6
Income Top 25%	3.3	.00	2.0	4.5	3.3	.00	2.0	4.5	3.3	.00	2.0	4.5	7.4	.00	4.0	10.7	6.3	.00	3.0	10.0
Income Mid 50%	2.8	.00	1.8	3.8	2.8	.00	1.8	3.8	2.8	.00	1.8	3.8	6.5	.00	3.7	9.2	5.4	.00	2.5	8.3
Income Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Rel. Attend >1/wk * >HS					-9.2	.01	-16.2	-2.3									-7.1	.05	-14.1	.01
Rel Attend 1 wk * HS					-8.7	.01	-15.7	-1.8									-7.5	.04	-14.4	-.49
Rel Att. 1/wk * < HS					0(a)	.	.	.									0(a)	.	.	.
Rel Att. 1/wk * >HS					-4.3	.20	-11.0	2.4									-2.5	.47	-9.3	4.3
Rel Att. 1/wk * HS					-4.4	.20	-11.1	2.3									-3.6	.30	-10.3	3.2
RelAtt. 1/wk * < HS					0(a)	.	.	.									0(a)	.	.	.
RelAtt. 1-3/mth * >HS					-12.4	.00	-19.2	-5.6									-10.8	.00	-17.7	-3.8
RelAtt. 1-3/mth * HS					-11.5	.00	-18.4	-4.7									-10.7	.00	-17.6	-3.8
RelAtt.1-3/mth * <HS					0(a)	.	.	.									0(a)	.	.	.

Table A.2 (Continued).

Models	Simple			Interaction of Education *Religious Attendance				Interaction of Work Amount*Religious Attendance			Interaction of Net Family Income*Religious Attendance			3 2-way Interaction of Educ. * Rel. Attend, Work Amt. * Rel. Attend, Income * Rel. Attend						
	B	Sig	CI	B	Sig	CI	B	Sig	CI	B	Sig.	CI	B	Sig.	CI					
Independent Variables 2000																				
RA Infreq. * >HS				-9.9	.00	-16.8	-3.0								-8.3	.02	-	-	15.3	1.3
Rel. Attend Infreq. * HS				-9.4	.01	-16.4	-2.5								-8.7	.02	-	-	15.7	-1.7
Rel. Attend Infreq. * <HS				0(a)	.	.	.								0(a)	.	.	.	.	.
Rel. Attend No * >HS				0(a)	.	.	.								0(a)	.	.	.	.	.
Rel. Attend No * HS				0(a)	.	.	.								0(a)	.	.	.	.	.
Rel. Attend No * <HS				0(a)	.	.	.								0(a)	.	.	.	.	.
Rel. Attend >1/wk *FT								-3.2	.05	-6.3	-1				-1.3	.44	-	-	4.6	2.0
Rel. Attend >1/wk *PT								0(a)	.	.	.				0(a)	.	.	.	.	.
Rel. Attend 1/wk *FT								-4.9	.00	-8.0	-1.8				-3.5	.04	-	-	6.7	-2
Rel. Attend 1/wk *PT								0(a)	.	.	.				0(a)	.	.	.	.	.
Rel. Attend 1-3/mth* FT								-5.2	.00	-8.4	-2.0				-4.1	.02	-	-	7.4	-7
Rel. Attend 1-3/mth* PT								0(a)	.	.	.				0(a)	.	.	.	.	.
Rel. Attend Infreq* FT								-6.2	.00	-9.4	-3.0				-5.2	.00	-	-	8.5	-1.8
Rel. Attend. Infreq*PT								0(a)	.	.	.				0(a)	.	.	.	.	.
Rel. Attend No*FT								0(a)	.	.	.				0(a)	.	.	.	.	.
Rel. Attend No*PT								0(a)	.	.	.				0(a)	.	.	.	.	.

Table A.2 (Continued).

Models	Simple			Interaction of Education *Religious Attendance			Interaction of Work Amount*Religious Attendance			Interaction of Net Family Income*Religious Attendance			3 2-way Interaction of Educ. * Rel. Attend, Work Amt. * Rel. Attend, Income * Rel. Attend				
	B	Sig.	CI	B	Sig	CI	B	Sig	CI	B	Sig.	CI	B	Sig.	CI		
Independent Variables 2000																	
Rel. Attend (RA) >1/wk *Missing Income										-8.8	.00	-12.8	-4.9	-8.2	.00	-	-4.1
RA>1/wk *Top25% Income										-5.5	.01	-9.6	-1.5	-5.1	.02	12.3	-8
RA*Mid50% Income										-5.0	.00	-8.3	-1.8	-4.6	.01	-8.0	-1.0
RA>1/wk *Low25% Income										0(a)	.	.	.	0(a)	.	.	.
RA1/wk *Missing Income										-5.5	.01	-9.3	-1.6	-4.6	.02	-8.6	-7
RA1/wk *Top25% Income										-4.6	.02	-8.5	-8	-4.0	.05	-8.0	.0
RA1/wk *Mid50% Income										-4.6	.01	-7.8	-1.4	-3.5	.04	-6.9	-1
RA1/wk *Low25% Income										0(a)	.	.	.	0(a)	.	.	.
RA 1-3/mth*Missing Income										-2.9	.14	-6.9	1.0	-1.8	.40	-5.9	2.3
RA1-3/mth *Top25% Income										-3.5	.08	-7.5	.4	-1.8	.38	-6.0	2.3
RA1-3/mth*Mid50% Income										-2.6	.12	-5.9	.7	-1.1	.55	-4.5	2.4
RA1-3/mth*Low25% Income										0(a)	.	.	.	0(a)	.	.	.
RA Infreq*Missing Income										-4.3	.04	-8.5	-2	-3.0	.17	-7.3	1.3
RA Infreq. *Top25% Income										-3.7	.08	-7.8	.5	-2.0	.37	-6.3	2.3
RA Infreq *Mid50% Income										-3.1	.09	-6.7	.5	-1.3	.50	-5.0	2.4
RA Infreq* Low 25% Income										0(a)	.	.	.	0(a)	.	.	.
RA No *Missing Income										0(a)	.	.	.	0(a)	.	.	.
RA No* Top25% Income										0(a)	.	.	.	0(a)	.	.	.
RA No*Mid50% Income										0(a)	.	.	.	0(a)	.	.	.
RA No*Low25% Income										0(a)	.	.	.	0(a)	.	.	.
Adj. R Squared	0.153			0.158			.159			0.167				.180			

^a Note: This parameter is set to zero because it is redundant.

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

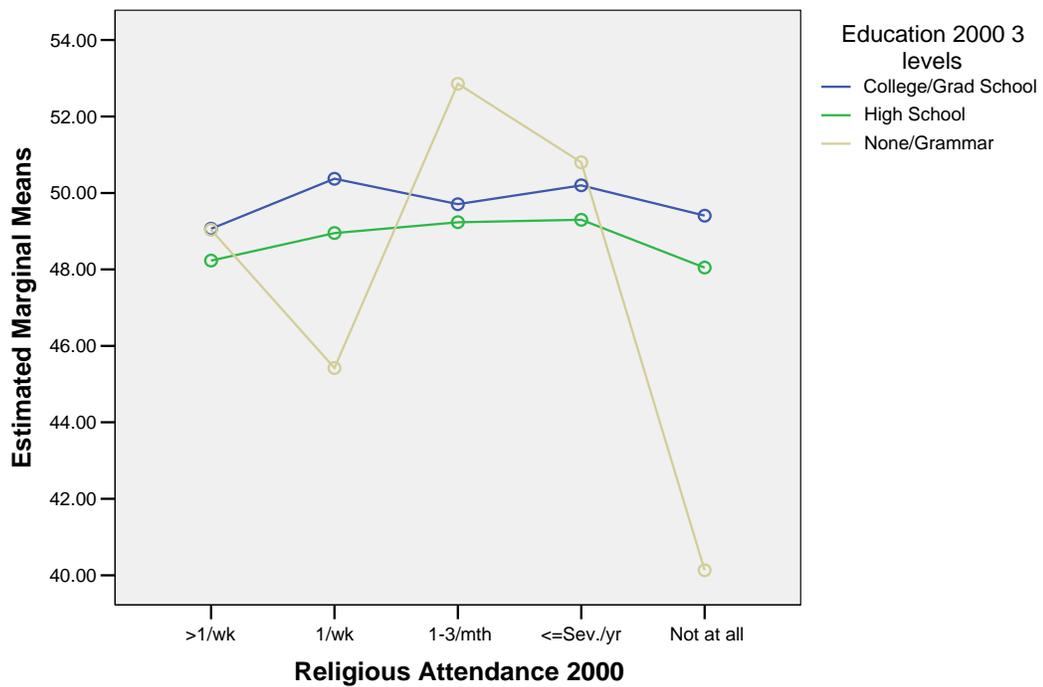


Figure A.1 Obj. I. Model of Physical Composite Score (PCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Education in 2000 (controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in household, work amount in 1999 and net family income in 1999).

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

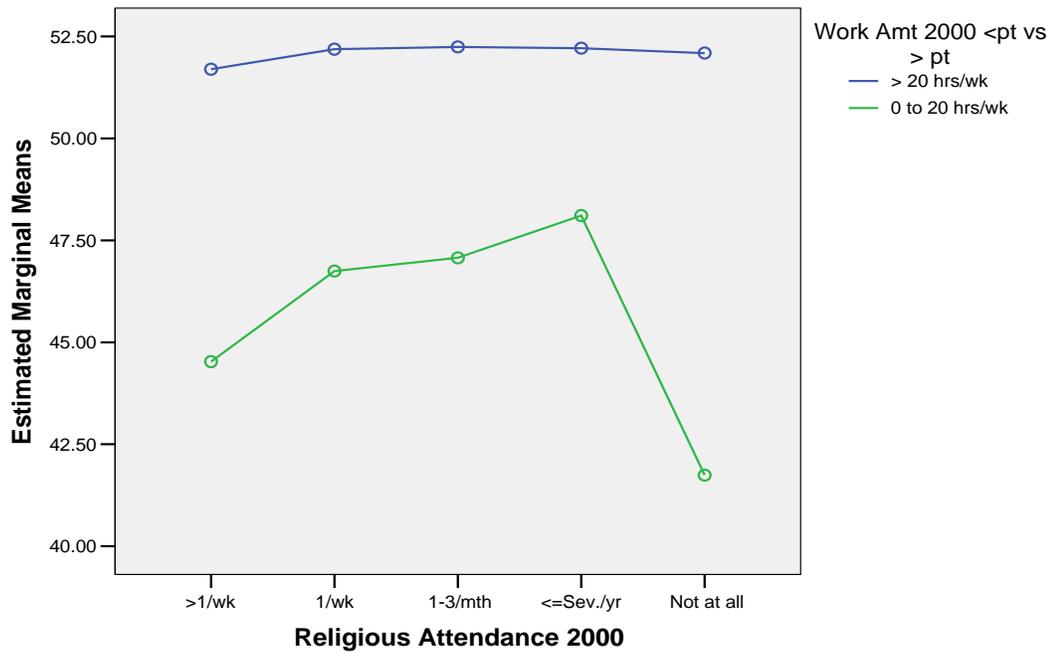


Figure A.2 Obj. I. Model of Physical Health Composite Score (SF-12 PCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Work Amount in 1999 (controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in household, work amount 1999 and net family income 1999).

Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS) 2000

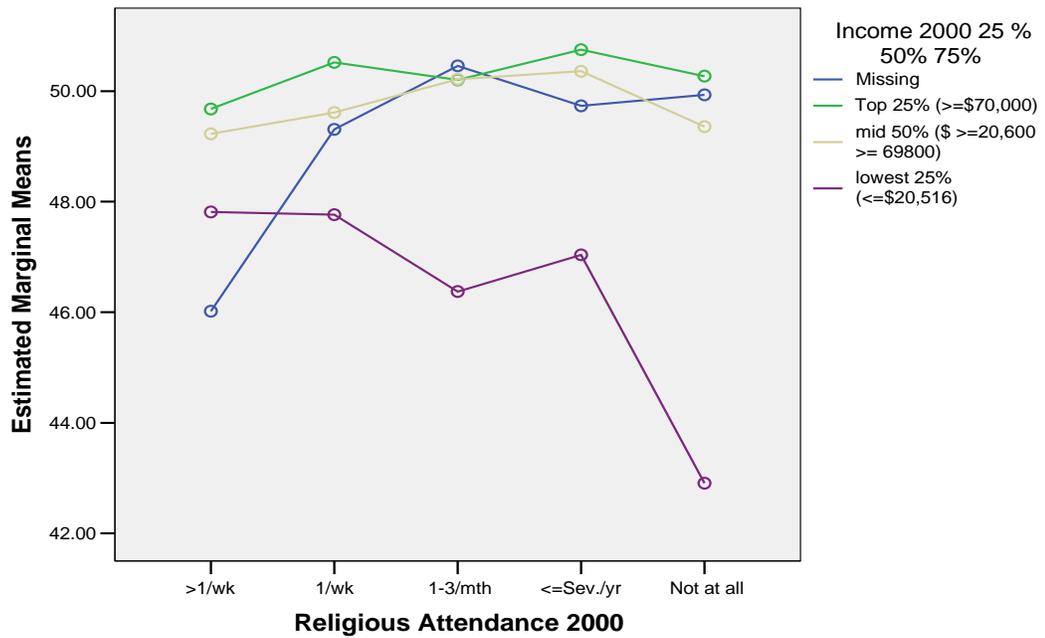


Figure A.3 Obj. I. Model of Physical Composite Score (SF-12 PCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Net Family Income in 1999 (controlling for key socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in household, work amount in 1999 and net family income in 1999).

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

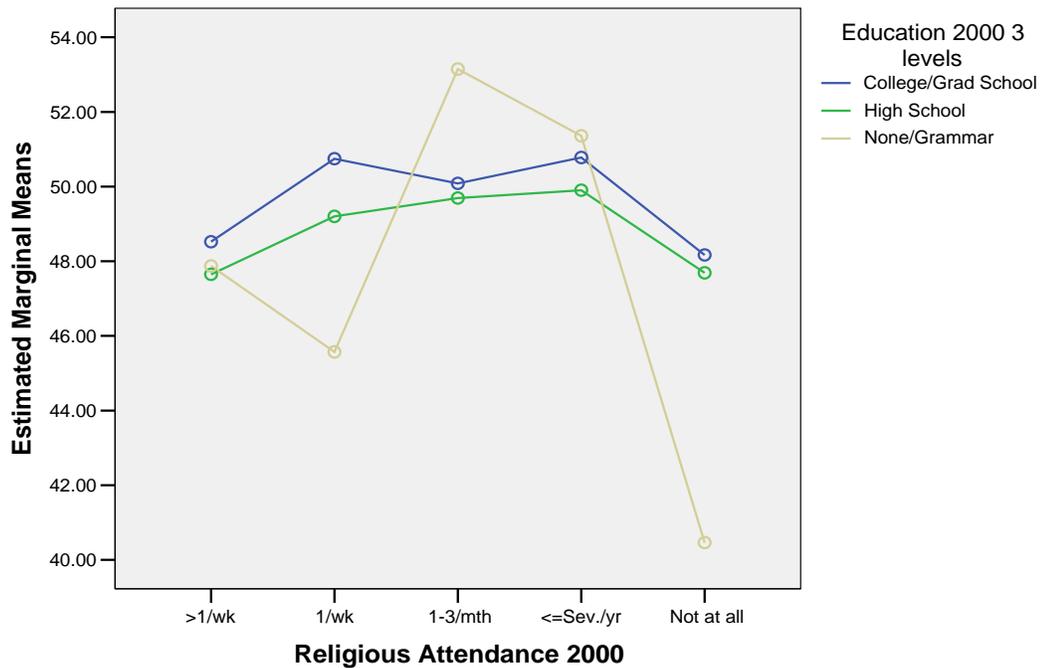


Figure A.4 Obj. I. Model of Physical Health Composite Score (SF-12 PCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Education in 2000 (in the presence of the Two-way interactions of religious attendance in 2000 with work amount in 1999 and religious attendance in 2000 with net family income in 1999; controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in household, work amount 1999 and net family income 1999).

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

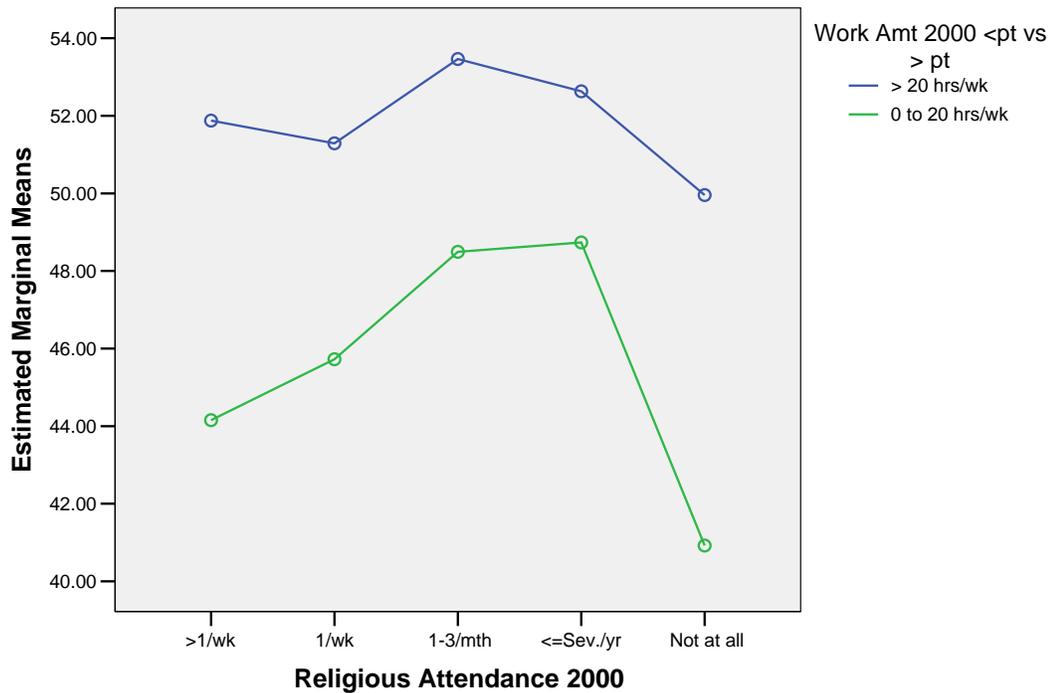


Figure A.5 Obj I. Model of Physical Health Composite Score (SF-12 PCS) in 2000 with the One Two-way of Interaction of Religious Attendance in 2000 with Work Amount in 1999 (in the presence of the Two-way interactions of religious attendance in 2000 with education in 2000 and religious attendance in 2000 with net family income in 1999; controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in household, work amount in 1999 and net family income in 1999).

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

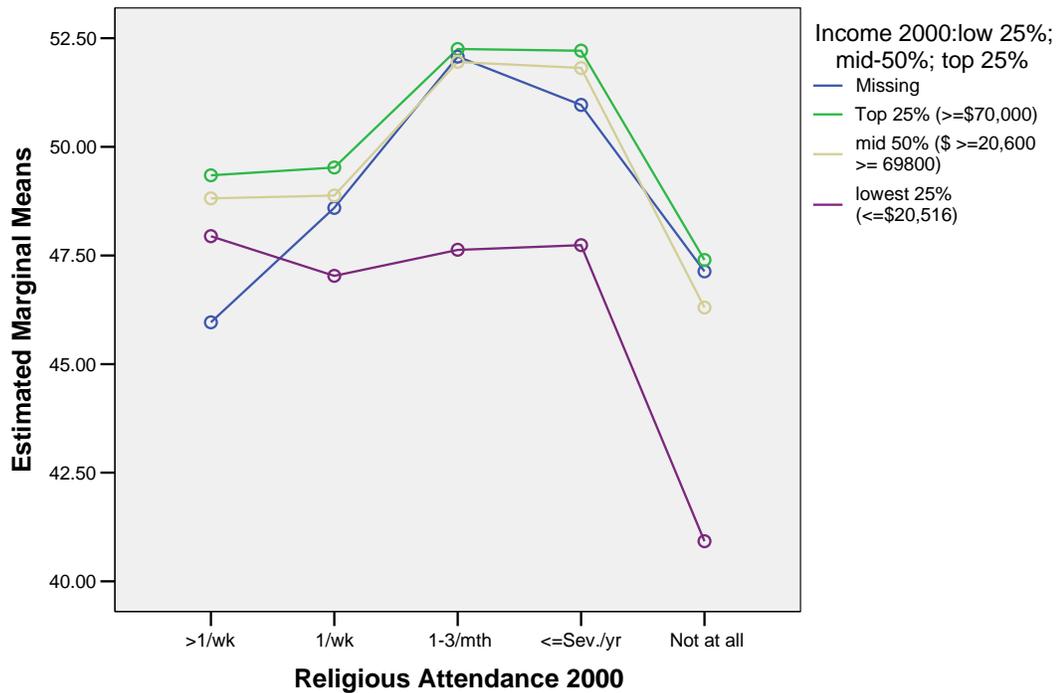


Figure A.6 Obj I. Model of Physical Health Composite Score (SF-12 PCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Net Family Income in 1999 (in the presence of the Two-way interactions of religious attendance in 2000 with education in 2000 and religious attendance in 2000 with work amount in 1999; controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in household, work amount in 1999 and net family income in 1999).

Table A.3 Obj. I. Simple Model, Two-way Interactions and Full Model (Two Two-way) Interactions of Religious Attendance in 2000 with Race/Ethnicity and Religious Attendance in 2000 with Education in 2000, on Mental Health Composite Score (SF-12 MCS) in 2000 (controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, children, work in 1999, income in 1999, & residence).

Dependent Variable: MentalHlh2000 Mental Health Composite Score (SF-12, MCS) 2000

	Simple				Interaction of Race/ethnicity*Rel. Attend				Interaction of Education*Rel. Attend.				2 2-way Interaction Race*Rel. Attend & Educ. Rel. Attend			
	B	Sig.	CI		B	Sig.	CI		B	Sig.	CI		B	Sig.	CI	
Intercept	48.8	.00	46.0	51.6	50.0	.00	46.9	53.1	50.4	.00	44.4	56.4	51.3	.00	44.9	57.7
Rel. Attend. >1/wk (RA)	.1	.90	-1.3	1.5	-2.1	.04	-4.2	-.1	1.6	.67	-5.8	8.9	-.5	.90	-8.2	7.2
RA 1/wk	-.4	.52	-1.8	.9	-2.0	.05	-3.9	.0	-9.0	.01	-16.3	-1.8	-10.6	.01	-18.3	-2.9
RA 1-3x/mth	.1	.88	-1.3	1.5	-1.5	.16	-3.6	.6	1.0	.79	-6.3	8.3	.0	.99	-7.7	7.8
RA <=Sev.x/yr (Infreq.)	.2	.80	-1.2	1.6	-.6	.57	-2.7	1.5	-1.2	.76	-8.5	6.2	-1.1	.79	-8.9	6.7
RA Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-2.0	.00	-2.7	-1.2	-1.9	.00	-2.6	-1.1	-2.0	.00	-2.8	-1.2	-1.9	.00	-2.7	-1.1
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	.4	.42	-.6	1.5	-.5	.76	-3.9	2.8	.5	.35	-.5	1.5	-.7	.68	-4.1	2.7
African American	.2	.61	-.7	1.2	-3.0	.02	-5.5	-.5	.3	.57	-.7	1.2	-2.8	.03	-5.3	-.2
Caucasians and others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Widowed/Separated	-1.2	.16	-2.9	.5	-1.0	.24	-2.7	.7	-1.2	.16	-2.9	.5	-1.1	.22	-2.7	.6
Divorced	-1.1	.10	-2.4	.2	-.9	.16	-2.2	.4	-1.1	.10	-2.4	.2	-1.0	.15	-2.2	.3
Married	.0	.99	-1.2	1.2	.2	.70	-1.0	1.5	.1	.88	-1.1	1.3	.3	.62	-.9	1.5
Never Married	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
> High School (HS)	1.0	.39	-1.2	3.2	1.0	.38	-1.2	3.2	-.1	.98	-6.2	6.0	.1	.97	-6.1	6.3
High School	.3	.82	-1.9	2.4	.3	.78	-1.9	2.5	-2.5	.43	-8.6	3.6	-1.9	.55	-8.2	4.4
< High School	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table A.3 (Continued).

	Simple				Interaction of Race and Religious Attendance				Interaction of Education*Religious Attendance				2 2-way Interaction of Race*Religious. Attendance and Education*Religious Attendance			
	B	Sig.	CI		B	Sig.	CI		B	Sig.	CI		B	Sig.	CI	
>=2 Children Living in Household	.4	.45	-6	1.4	.3	.51	-7	1.3	.4	.42	-6	1.4	.4	.47	-6	1.3
1 Child Living in Household	-.3	.56	-1.5	.8	-.4	.53	-1.5	.8	-.4	.50	-1.5	.7	-.4	.48	-1.5	.7
No Children Living in Household	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work>20 hrs/wk (FT)	3.6	.00	2.6	4.7	3.7	.00	2.7	4.8	3.7	.00	2.7	4.7	3.8	.00	2.8	4.8
0-20 hrs/wk (PT)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income Missing	.6	.34	-6	1.9	.5	.44	-8	1.7	.6	.36	-7	1.8	.5	.46	-8	1.7
Income Top 25%	2.4	.00	1.0	3.8	2.2	.00	.9	3.6	2.4	.00	1.0	3.8	2.2	.00	.8	3.6
Income Mid 50%	1.4	.01	.3	2.5	1.4	.02	.2	2.5	1.4	.01	.3	2.6	1.4	.02	.3	2.5
Income Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence: Unknown	5.0	.00	2.3	7.7	4.9	.00	2.2	7.6	5.0	.00	2.3	7.7	4.9	.00	2.2	7.6
Rural	.8	.08	-1	1.7	.7	.13	-2	1.6	.8	.09	-1	1.7	.7	.14	-2	1.6
Urban	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
RA>1/wk * Hispanic					2.4	.25	-1.7	6.4					2.4	.25	-1.7	6.5
RA >1/wk * African American					6.0	.00	2.8	9.2					5.7	.00	2.5	8.9
RA >1/wk * Caucasians and others					0(a)	.	.	.					0(a)	.	.	.
RA 1/wk * Hispanic					1.2	.53	-2.6	5.1					2.0	.32	-1.9	5.9
RA 1/wk * African American					3.3	.03	.3	6.3					3.2	.04	.2	6.2
RA 1/wk * Caucasians and others					0(a)	.	.	.					0(a)	.	.	.
RA1-3/mth * Hispanic					.9	.65	-3.0	4.9					.8	.69	-3.2	4.9
RA 1-3/mth * African American					3.6	.02	.6	6.6					3.3	.03	.2	6.3
RA 1-3/mth * Caucasians and others					0(a)	.	.	.					0(a)	.	.	.

Table A.3 (Continued).

	Simple				1 2-way Interaction of Race/Ethnicity* Religious Attendance				1 2-way Interaction of Education*Religious Attendance				2 2-way Interaction of Race/Ethnicity *Rel. Attend & Education*Rel. Attend.			
	B	Sig.	CI		B	Sig	CI		B	Sig	CI		B	Sig.	CI	
RA Infreq. * >HS									1.2	.76	-6.4	8.7	.4	.92	-7.3	8.2
RA Infreq. * HS									1.6	.68	-6.0	9.2	.6	.88	-7.2	8.4
RA Infreq. * <HS									0(a)	.	.	.	0(a)	.	.	.
RA No * >HS									0(a)	.	.	.	0(a)	.	.	.
RA No * HS									0(a)	.	.	.	0(a)	.	.	.
RA No * <HS									0(a)	.	.	.	0(a)	.	.	.
Adj R Square	0.068				0.072				0.074				0.078			
Corrected Model df	20 F=8.5 p=0.00				28 F=6.7 p= 0.00				28 F=6.7 p= 0.00				36 F=5.8 p= 0.00			
Error df	2022				2014				2014				2006			
Total df	2043				2043				2043				2043			

^a This parameter is set to zero because it is redundant.

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

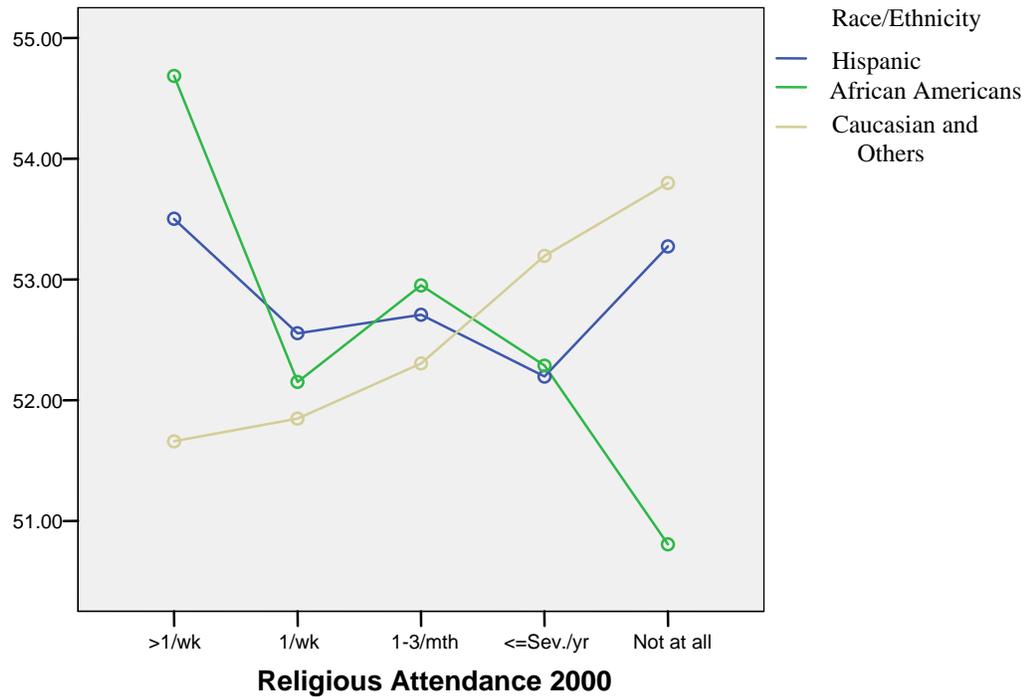


Figure A.7 Obj. I. Model of Mental Health Composite Score (SF-12 MCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Race/Ethnicity (controlling for socio-demographic variables in 2000 of gender, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999, and residence).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

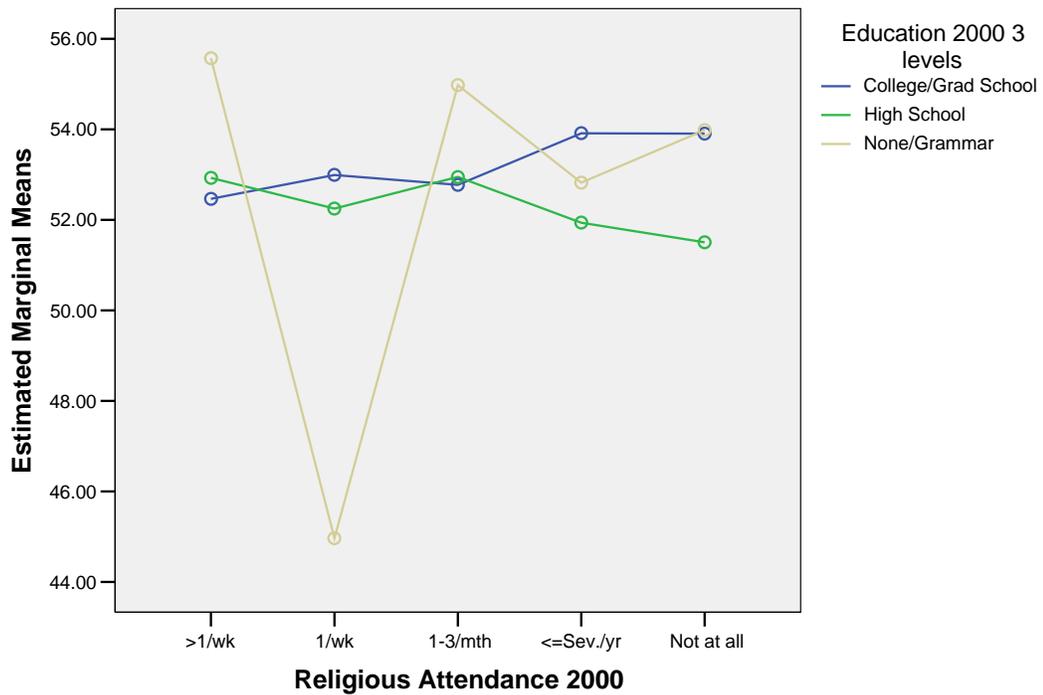


Figure A.8 Obj. I. Model of Mental Health Composite Score (SF-12 MCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Education in 2000 (controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999, and residence).

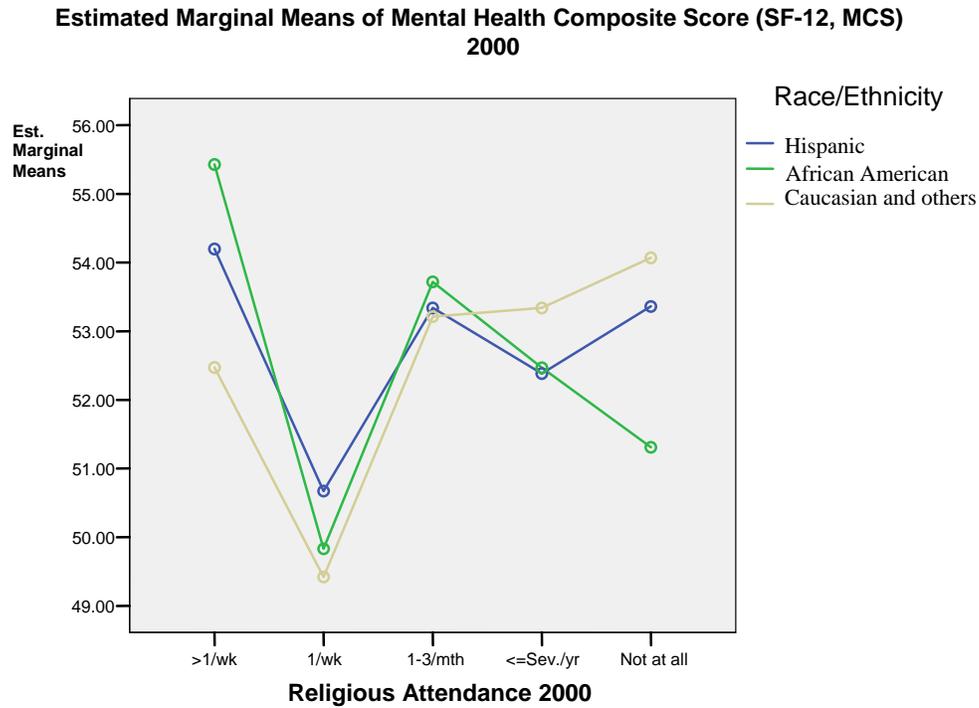


Figure A.9 Obj. I. Model of Mental Health Composite Score (SF-12 MCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Race/Ethnicity in 2000 (in the presence of the two-way interaction of Religious Attendance with Education in 2000; controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999, and residence).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

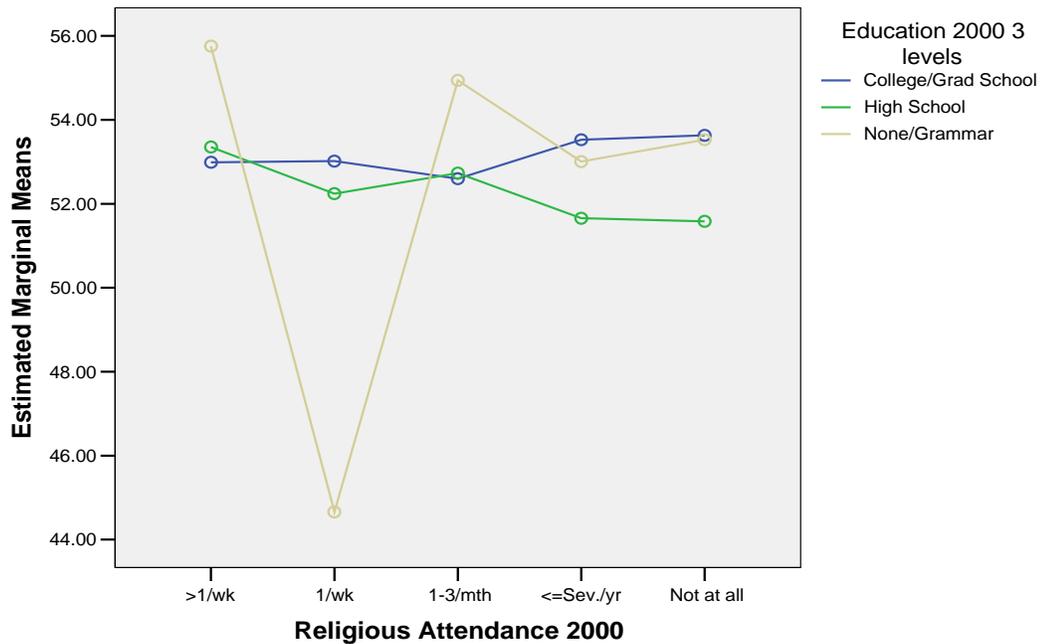


Figure A.10 Obj. I. Model of Mental Health Composite Score (SF-12 MCS) in 2000 with the One Two-way Interaction of Religious Attendance in 2000 with Education in 2000 (in the presence of the two-way interaction of religious attendance in 2000 with race/ethnicity; controlling for socio-demographic variables in 2000 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999, and residence).

Table A.4 Obj. I. Simple and One Two-way Interaction Models of Religious Attendance in 2000 with Race/Ethnicity and Religious Attendance in 2000 with Marital Status in 2000 on CES-Depression (CES-D) Scores in 2000 (controlling for socio-demographic variables in 2000 of gender, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999 and region).

Dependent Variable: CES-Depression 2000

Models	Simple				1 2-way Interaction Race/ethnicity*Religious Attendance				1 2-way Interaction Marital Status*Religious Attendance			
	B	Sig.	CI		B	Sig.	CI		B	Sig.	CI	
Sociodemographic Variables 2000												
Intercept	5.5	.00	4.1	6.9	4.9	.00	3.4	6.5	6.2	.00	4.3	8.1
Rel. Attend. >1/Wk (Rel. Attend)	.4	.26	-.3	1.1	1.3	.01	.3	2.3	-.6	.45	-2.2	1.0
Rel. Attend 1/Wk	.2	.58	-.5	.9	.9	.06	-.1	1.9	-.8	.31	-2.4	.8
Rel. Attend 1-3x/Mth	-.1	.86	-.7	.6	.6	.22	-.4	1.7	-.2	.78	-1.9	1.4
Rel. Attend <=Sev.X/Yr (Infreq.)	-.2	.55	-.9	.5	.1	.86	-.9	1.1	-.8	.36	-2.6	.9
Rel. Attend Not At All (No)	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.
Female	.9	.00	.6	1.3	.9	.00	.5	1.3	.9	.00	.5	1.3
Male	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.
Hispanic	.3	.21	-.2	.9	.5	.56	-1.1	2.1	.4	.17	-.2	.9
African American	.5	.02	.1	1.0	2.0	.00	.8	3.2	.5	.03	.1	1.0
Caucasians And Others	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.
Widowed/Sepa Rel. Attend Ted	.4	.37	-.4	1.2	.3	.46	-.5	1.1	1.7	.16	-.7	4.1
Divorced	1.0	.00	.4	1.6	1.0	.00	.4	1.6	.9	.44	-1.4	3.2
Married	-.2	.54	-.8	.4	-.3	.39	-.8	.3	-1.4	.08	-3.0	.2
Never Married	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.
> High School (Hs)	-.6	.24	-1.7	.4	-.6	.23	-1.7	.4	-.6	.24	-1.7	.4
High School	.1	.90	-1.0	1.1	.1	.91	-1.0	1.1	.1	.91	-1.0	1.1
< High School	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.

Table A.4 (Continued).

Models	Simple				1 2-Way Interaction of Race/Ethnicity*Religious Attendance				1 2-Way Interaction of Marital Status*Religious Attendance			
	B	Sig.	Ci		B	Sig	Ci		B	Sig	Ci	
Sociodemographic Variables 2000												
>=2 Children	-.1	.59	-.6	.3	-.1	.61	-.6	.4	-.1	.59	-.6	.3
1 Child	.2	.40	-.3	.8	.2	.39	-.3	.8	.2	.40	-.3	.8
No Children	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.
Work>20 Hrs/Wk (Ft)	-2.0	.00	-2.5	-1.5	-2.0	.00	-2.5	-1.5	-2.0	.00	-2.5	-1.5
0-20 Hrs/Wk (Pt)	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.
Income Missing	-1.0	.00	-1.7	-.4	-1.0	.00	-1.6	-.4	-1.0	.00	-1.6	-.4
Income Top 25%	-2.2	.00	-2.9	-1.5	-2.1	.00	-2.8	-1.4	-2.2	.00	-2.8	-1.5
Income Mid 50%	-1.8	.00	-2.4	-1.3	-1.8	.00	-2.4	-1.3	-1.8	.00	-2.3	-1.3
Income Lowest 25%	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.
Region: West	.4	.21	-.2	1.0	.4	.22	-.2	1.0	.3	.29	-.3	.9
South	.7	.01	.1	1.2	.7	.01	.1	1.2	.7	.02	.1	1.2
North Central. Attend L	.4	.14	-.1	1.0	.5	.11	-.1	1.1	.5	.13	-.1	1.0
Northeast	0(A)	.	.	.	0(A)	.	.	.	0(A)	.	.	.
Rel. Attend >1/Wk * Hispanic					-1.1	.25	-3.1	.8				
Rel. Attend >1/Wk * African American					-2.0	.01	-3.5	-.4				
Rel. Attend >1/Wk * Caucasians And Others					0(A)	.	.	.				
Rel. Attend 1/Wk * Hispanic					-.5	.61	-2.3	1.4				
Rel. Attend 1/Wk * African American					-1.7	.02	-3.1	-.2				
Rel. Attend 1/Wk * Caucasians And Others					0(A)	.	.	.				

Table A.4 (Continued).

Models	Simple				1 2-Way Interaction of Race/Ethnicity*Religious Attendance				1 2-Way Interaction of Marital Status*Religious Attendance			
	B	Sig.	Ci		B	Sig	Ci		B	Sig	Ci	
Sociodemographic Variables 2000												
Rel. Attend 1-3/Mth * Hispanic					.4	.72	-1.6	2.3				
Rel. Attend 1-3/Mth * African American					-1.9	.01	-3.4	-.4				
Rel. Attend 1-3/Mth * Caucasians And Others					0(A)	.	.	.				
Rel. Attend Infreq. * Hispanic					.7	.48	-1.2	2.6				
Rel. Attend Infreq. * African American					-1.0	.19	-2.6	.5				
Rel. Attend Infreq.* Caucasians And Others					0(A)	.	.	.				
Rel. Attend No * Hispanic					0(A)	.	.	.				
Rel. Attend No * African American					0(A)	.	.	.				
Rel. Attend No* Caucasians And Others					0(A)	.	.	.				
Rel. Attend >1/Wk*Marital Status Widowed/Sepa Rel. Attend Ted									-3.1	.04	-5.9	-.2
Rel. Attend >1/Wk * Divorced									.4	.76	-2.2	3.0
Rel. Attend >1/Wk* Married									2.0	.03	.2	3.9
Rel. Attend >1/Wk * Never Married									0(A)	.	.	.
Rel. Attend 1/Wk * Wid/Separel. Attend Ted									.2	.87	-2.5	3.0
Rel. Attend 1/Wk * Divorced									.7	.59	-1.8	3.2
Rel. Attend 1/Wk * Married									1.4	.13	-.4	3.1
Rel. Attend 1/Wk * Never Married									0(A)	.	.	.

Table A.4 (Continued).

Models	Simple				1 2-Way Interaction of Race/Ethnicity*Religious Attendance				1 2-Way Interaction of Marital Status*Religious Attendance			
	B	Sig.	Ci		B	Sig	Ci		B	Sig	Ci	
Sociodemographic Variables 2000												
Rel. Attend 1-3/Mth* Wid./Separel. Attend Ted									-2.1	.17	-5.0	.9
Rel. Attend 1-3/Mth * Divorced									-.8	.56	-3.4	1.8
Rel. Attend 1-3/Mth* Married									.6	.50	-1.2	2.5
Rel. Attend 1-3/Mth* Never Married									0(A)	.	.	.
Rel. Attend Infreq* Wid./Sepa Rel. Attend Ted									-2.1	.20	-5.3	1.1
Rel. Attend Infreq. * Divorced									-.2	.90	-3.0	2.6
Rel. Attend Infreq * Married									1.1	.24	-.8	3.1
Rel. Attend Infreq* Never Married									0(A)	.	.	.
Rel. Attend No * Wid./Separel. Attend Ted									0(A)	.	.	.
Rel. Attend No* Divorced									0(A)	.	.	.
Rel. Attend No* Married									0(A)	.	.	.
Rel. Attend No* Never Married									0(A)	.	.	.
Adj R Square	0.146				0.149				.152			
Corrected Model Df	21 F=17.7 P=0.00				29 F=13.4 P=0.00				33 F=12.2 P=0.00			
Error Df	2036				2028				2024			
Total Df	2058				2058				2058			

^a This parameter is set to zero because it is redundant.

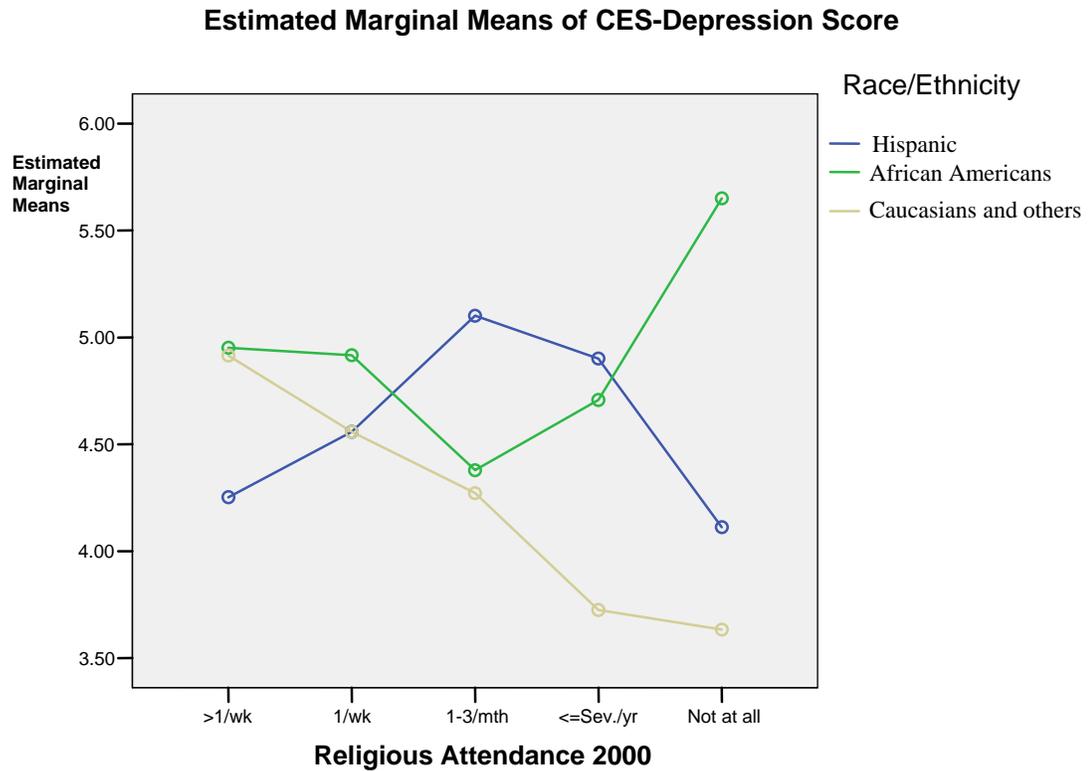


Figure A.11 Obj. I. Model of CES-Depression (CES-D) in 2000 with the One Two-way Interaction of Religious Attendance with Race/Ethnicity (controlling for socio-demographic variables in 2000 of gender, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999 and region).

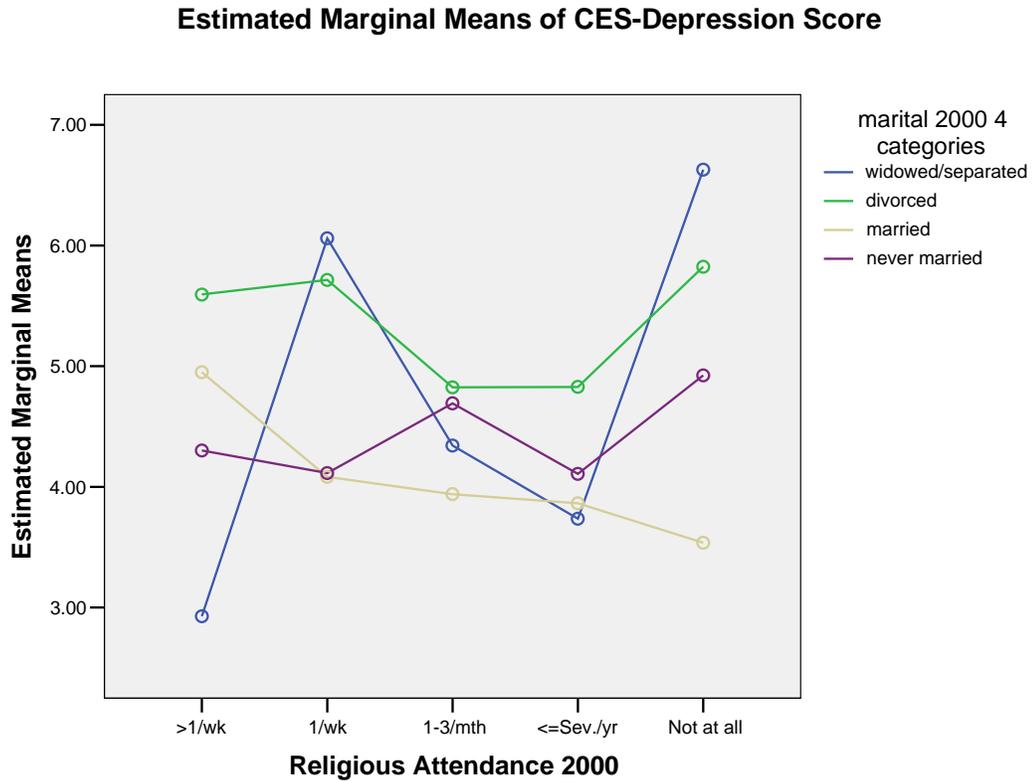


Figure A.12 Obj. I. Obj. I. Model of CES-Depression (CES-D) in 2000 with the One Two-way Interaction of Religious Attendance with Marital Status in 2000 (controlling for socio-demographic variables in 2000 of gender, marital status, education, number of children living in the household, work amount in 1999, net family income in 1999 and region).

APPENDIX B Objective II

Table B.1 Obj.II ANOVA of the Simple Model. Physical Health, Mental Health & Depression Scores in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 and 1998 of gender, race/ethnicity, marital status in 1982 and 1998, education in 1982, number of children living in the household in 1982 and 1998, work amount in 1981 and 1997, net family income in 1981 and 1997, residence in 1982 and 1997 and region in 1982).

Independent Variables 1982 Source	Physical Health Composite Score (SF-12 PCS) 2000			Mental Health Composite Score (SF-12 MCS) 2000			CES-Depression Score (CES-D) 2000		
	df	F	Sig.	df	F	Sig.	df	F	Sig.
Corrected Model	30	7.0	.00	30	2.7	.00	30	7.5	.00
Intercept	1	3515.9	.00	1	3971.1	.00	1	164.3	.00
Religious Attendance 1982	4	.8	.51	4	2.5	.04	4	1.6	.17
Health Could Limit Amt/Kind Work 1981	1	39.0	.00	1	1.8	.18	1	10.9	.00
Gender	1	.9	.35	1	14.7	.00	1	5.3	.02
Race/Ethnicity	2	4.0	.02	2	.3	.74	2	.6	.56
Marital 1982	2	.6	.55	2	.6	.55	2	.1	.91
Education 1982	1	1.6	.20	1	.1	.79	1	.0	.91
Child Number Living in Household 1982	2	1.2	.31	2	1.2	.30	2	4.4	.01
Work Amount 1981	1	.5	.49	1	1.1	.30	1	.1	.72
Net Family Income 1981	3	.1	.98	3	.5	.65	3	.4	.77
Residence 1982	1	1.5	.23	1	.4	.53	1	.9	.34
Region 1982	3	.3	.80	3	1.8	.14	3	4.9	.00
Marital 1998	2	5.5	.00	2	1.8	.16	2	13.8	.00
Child # in Household 1998	2	1.2	.30	2	.1	.93	2	1.1	.34
Work Amount 1997	1	80.1	.00	1	14.2	.00	1	51.8	.00
Net Family Income 1997	3	1.0	.37	3	.8	.49	3	2.1	.09
Residence 1998	1	1.0	.32	1	2.2	.14	1	1.9	.17
Error	1638			1638			1643		
Total	1669			1669			1674		
Corrected Total	1668			1668			1673		
a Adj. R Squared	0.097			0.029			0.104		

Table B.2 Obj. II. Parameter Estimates of the Simple Model. Physical Health, Mental Health & Depression Scores in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 and 1998 of gender, race/ethnicity, marital status in 1982 and 1998, education in 1982, number of children living in the household in 1982 and 1998, work amount in 1981 and 1997, net family income in 1981 and 1997, residence in 1982 and 1998 and region in 1982).

Independent Variables 1982, 1998 Parameters	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	48.0	.00	45.1	50.9	51.9	.00	48.8	55.1	4.7	.00	3.2	6.2
Rel. Attend. 1982 >1wk (RA)	.4	.63	-1.3	2.1	2.0	.04	.1	3.8	-.9	.05	-1.8	.0
Rel. Attend 1982 1/wk	1.0	.13	-.3	2.3	1.4	.04	.1	2.8	-.5	.18	-1.1	.2
Rel Attend 1982 1-3x/mth	-.1	.87	-1.3	1.1	1.7	.01	.4	2.9	-.7	.03	-1.3	-.1
Rel Attend 1982 <=Sev.x/yr (Infreq.)	.2	.71	-.9	1.3	1.5	.01	.4	2.6	-.5	.09	-1.0	.1
Rel Attend 1982 Not at all (No)	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
1981 Hlh Limits Work Yes	-5.6	.00	-7.4	-3.9	-1.3	.18	-3.2	.6	1.5	.00	.6	2.5
1981 Hlh Limits Work No	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Female	-.4	.35	-1.3	.5	-1.8	.00	-2.7	-.9	.5	.02	.1	1.0
Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Hispanic	-1.6	.01	-2.7	-.4	.5	.45	-.8	1.8	.1	.76	-.5	.7
African American	-1.1	.05	-2.1	.0	.2	.67	-.9	1.4	.3	.28	-.2	.8
Caucasian and Others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Marital Status 1982: Div./Wid./Sep. 1982	-1.0	.28	-2.8	.8	-.2	.81	-2.1	1.7	-.2	.74	-1.1	.8
Married 1982	-.2	.73	-1.3	.9	-.7	.28	-1.9	.5	-.1	.72	-.7	.5
Never Married 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Education Level: >=High School 1982	1.4	.20	-.8	3.6	.3	.79	-2.0	2.6	.1	.91	-1.0	1.2
< High School 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table B.2 (Continued).

Independent Variables 1982, 1998 Parameters	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
>=2 Children 1982	-1.2	.12	-2.6	.3	-1.1	.18	-2.7	.5	1.1	.00	.4	1.9
1 Child 1982	-.4	.48	-1.7	.8	.1	.90	-1.2	1.4	.6	.08	-.1	1.2
No Children 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time 1981	-.3	.49	-1.3	.6	-.6	.30	-1.6	.5	.1	.72	-.4	.6
Work Part-Time 1981	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Income 1981 Missing	-.2	.79	-1.5	1.1	-.8	.27	-2.1	.6	.2	.53	-.5	.9
Income 1981 Top 25%	-.1	.90	-1.4	1.2	-.7	.29	-2.1	.6	.3	.34	-.3	1.0
Income 1981 Mid 50%	.1	.92	-1.0	1.1	-.5	.34	-1.7	.6	.3	.36	-.3	.8
Income 1981 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence 1982 Urban	-.7	.23	-1.7	.4	.4	.53	-.8	1.5	-.3	.34	-.8	.3
Residence 1982 Rural	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region 1982: West	-.6	.35	-2.0	.7	-.7	.34	-2.1	.7	.6	.09	-.1	1.3
South 1982	-.3	.57	-1.5	.8	-1.2	.07	-2.4	.1	1.2	.00	.6	1.8
North Central 1982	-.5	.43	-1.7	.7	.0	.99	-1.3	1.3	.6	.05	.0	1.3
Northeast 1982	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table B.2 (Continued).

Independent Variables 1982, 1998 Parameters	Physical Health Composite Score (SF-12 PCS) 2000				Mental Health Composite Score (SF-12 MCS) 2000				CES-Depression Score (CES-D) 2000			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Marital Status 1998 Div./Wid./Sep. 1998	-.1	.82	-1.4	1.2	-.2	.79	-1.6	1.2	.4	.22	-.2	1.1
Married 1998	1.6	.01	.3	2.9	.9	.19	-.4	2.3	-1.1	.00	-1.7	-.4
Never Married 1998	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
>=2 Children in Household 1998	.9	.12	-.2	1.9	-.2	.75	-1.3	1.0	.4	.15	-.1	1.0
1 Child in Household 1998	.6	.39	-.7	1.8	-.2	.72	-1.6	1.1	.3	.32	-.3	1.0
No Children in Household 1998	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time 1997	4.7	.00	3.7	5.8	2.1	.00	1.0	3.2	-2.0	.00	-2.5	-1.4
Work Part-Time 1997	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Net Family Income 1997 Missing	-1.0	.13	-2.2	.3	-.9	.17	-2.3	.4	-.3	.30	-1.0	.3
Net Family Income 1997 Top 25%	-1.1	.12	-2.4	.3	-.1	.92	-1.5	1.4	-.4	.21	-1.1	.3
Net Family Income 1997 Mid 50%	-.6	.30	-1.7	.5	-.2	.75	-1.4	1.0	-.7	.01	-1.3	-.1
Net Family Income 1997 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence 1998 Urban	-.5	.32	-1.4	.4	.7	.14	-.2	1.7	-.3	.17	-.8	.1
Residence 1998 Rural	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Note: Due to multicollinearity Education 1998 and Region 1998 were not included in the above model.

^a This parameter is set to zero because it is redundant.

**Estimated Marginal Means of Physical Health Composite Score (SF-12, PCS)
2000**

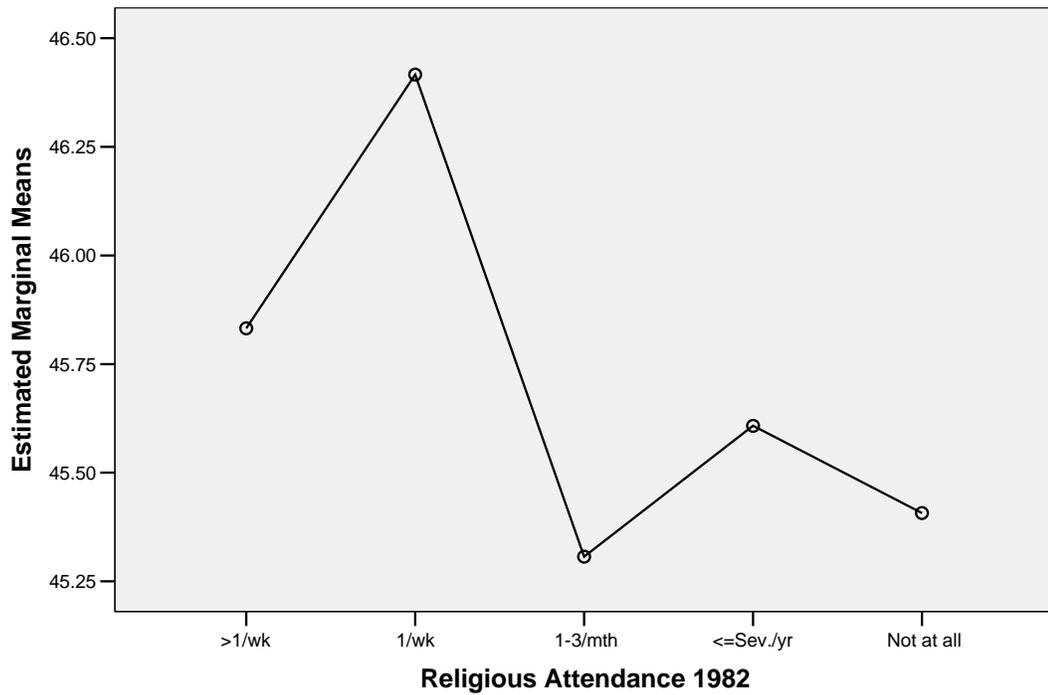


Figure B.1 Obj. II. Simple Model of the Physical Health Composite Score (SF-12 PCS) in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 and 1998 of gender race/ethnicity, marital status in 1982 and 1998, education in 1982, number of children living in the household in 1982 and 1998, work amount in 1981 and 1997, net family income in 1981 and 1997, residence in 1982 and 1998 and region in 1982).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

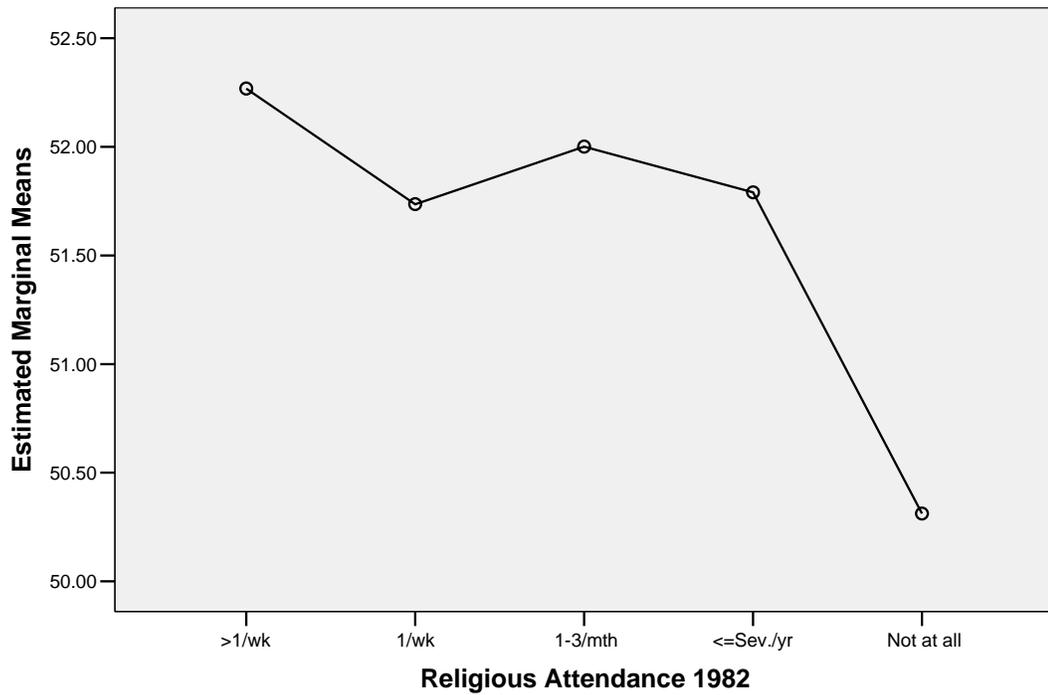


Figure B.2 Obj. II. Simple Model of the Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 and 1998 of gender race/ethnicity, marital status in 1982 and 1998, education in 1982, number of children living in the household in 1982 and 1998, work amount in 1981 and 1997, net family income in 1981 and 1997, residence in 1982 and 1998 and region in 1982).

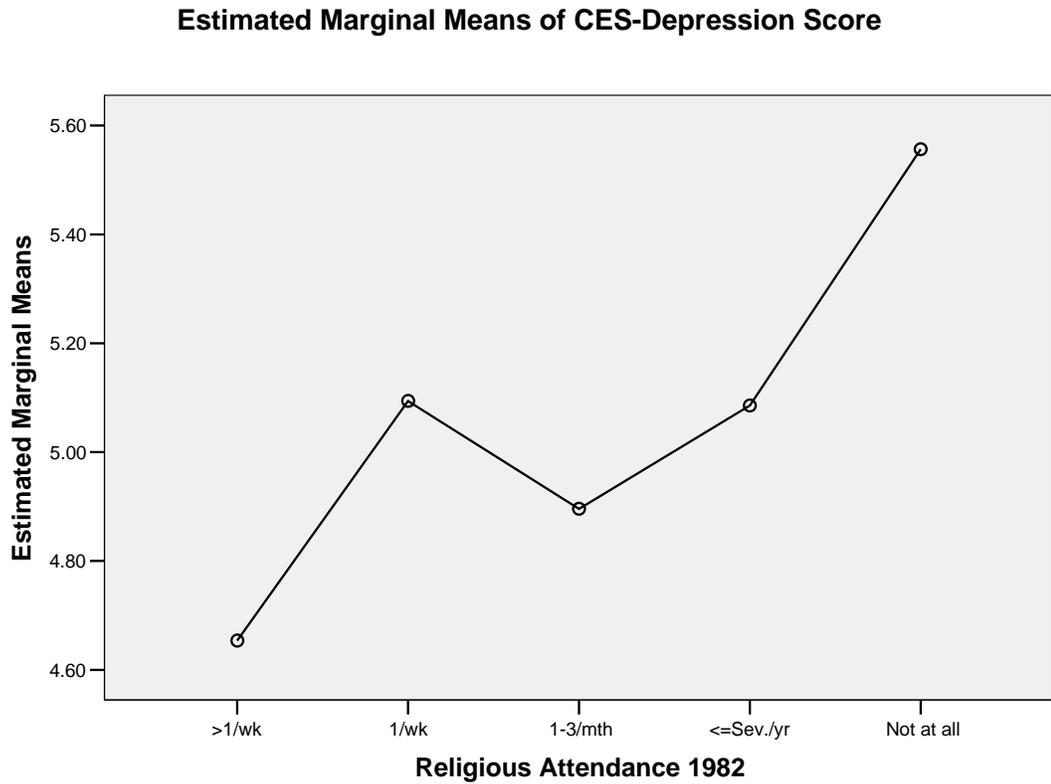


Figure B.3 Obj. II. Simple Model of the CES-Depression Score (CES-D) in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 and 1998 of gender race/ethnicity, marital status in 1982 and 1998, education in 1982, number of children living in the household in 1982 and 1998, work amount in 1981 and 1997, net family income in 1981 and 1997, residence in 1982 and 1998 and region in 1982).

Table B.3 Obj. II. ANOVA Complete Model of Mental Health Composite Score in 2000 by One Two-way Interaction of Religious Attendance in 1982 with Race/Ethnicity, and One Two-way Interaction of Religious Attendance in 1982 with Number of Children Living in the Household in 1982, and Two Two-way Interactions of Religious Attendance in 1982 with Race/Ethnicity and Religious Attendance in 1982 with Number of Children Living in the Household in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 1982 Source	1 2-way Interaction Race/Ethnicity*Religious Attend			1 2-way Interaction Child #*Religious Attendance			2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance		
	df	F	Sig.	df	F	Sig.	df	F	Sig.
Corrected Model	29	2.7	.00	29	2.7	.00	37	2.5	.00
Intercept	1	5013.5	.00	1	4984.5	.00	1	4925.1	.00
Religious Attendance (RA) 1982	4	2.0	.09	4	3.8	.00	4	2.8	.02
Health Could Limit Amt/Kind Work 1981	1	2.4	.12	1	2.0	.16	1	2.2	.14
Gender	1	21.5	.00	1	22.0	.00	1	21.2	.00
Race/Ethnicity	2	1.1	.32	2	.7	.51	2	1.3	.27
Marital 1982	2	.6	.57	2	.7	.49	2	.7	.51
Education 1982	1	.0	.85	1	.0	.90	1	.0	.89
Child # in Household 1982	2	2.0	.14	2	2.8	.06	2	2.9	.05
Work Amount 1981	1	.4	.53	1	.2	.69	1	.2	.66
Net Family Income 1981	3	1.0	.41	3	1.0	.39	3	1.0	.38
Residence 1982	1	.4	.51	1	.4	.53	1	.3	.57
Region 1982	3	1.0	.42	3	1.1	.36	3	.9	.45
Religious Attendance1982*Race/Ethnicity	8	2.2	.02				8	2.0	.04
Religious Attendance 1982*Child # 1982				8	2.3	.02	8	2.1	.03
Error	1797			1797			1789		
Total	1827			1827			1827		
Corrected Total	1826			1826			1826		
a Adj. R Squared	0.026			0.026			0.030		

Table B.4 Obj. II. Parameter Estimates of the Complete Model of Mental Health Composite Score in 2000 by One Two-way Interaction of Religious Attendance in 1982 with Race/Ethnicity, and One Two-way Interaction of Religious Attendance in 1982 with Number of Children Living in the Household in 1982, and Two Two-way Interactions of Religious Attendance in 1982 with Race/Ethnicity and Religious Attendance in 1982 with Number of Children Living in the Household in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 82	1 2-way Interaction Race/Ethnicity*Religious Attend				1 2-way Interaction Child #*Religious Attendance				2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	53.5	.00	50.8	56.2	54.5	.00	51.8	57.2	53.8	.00	51.0	56.5
Rel. Attend. (RA) 1982 >1/wk	3.1	.01	.7	5.5	2.8	.01	.7	4.8	3.6	.01	1.0	6.1
Rel. Attend 1982 1/wk	3.4	.00	1.6	5.2	.8	.29	-.7	2.3	3.0	.00	1.0	4.9
Rel. Attend 1982 1-3x/mth	2.4	.00	.8	4.0	1.7	.01	.3	3.1	2.4	.01	.7	4.1
Rel. Attend 1982<=Sev.x/yr (Infreq.)	1.5	.03	.1	3.0	.5	.45	-.8	1.7	.9	.22	-.6	2.4
Rel. Attend 1982 not at all	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
1981 Hlh Limits Work: Yes	-1.4	.12	-3.2	.4	-1.3	.16	-3.1	.5	-1.4	.14	-3.2	.4
1981 Hlh Limits Work: No	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Gender: Female	-2.0	.00	-2.8	-1.1	-2.0	.00	-2.8	-1.2	-2.0	.00	-2.8	-1.1
Gender: Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Race/Ethnicity: Hispanic	.7	.54	-1.5	2.9	.1	.83	-1.0	1.3	1.0	.41	-1.3	3.2
Race/Ethnicity: African American	1.3	.17	-.6	3.2	-.5	.31	-1.5	.5	1.3	.16	-.5	3.2
Race/Ethnicity: Caucasian and all others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Marital 1982: Divorce/Sep./Widow	-.4	.66	-2.1	1.3	-.6	.53	-2.3	1.2	-.6	.52	-2.3	1.2
Marital 1982: Married	-.6	.29	-1.7	.5	-.6	.25	-1.7	.5	-.6	.27	-1.7	.5
Marital 1982: Never Married	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Education 1982: >=High School	.2	.85	-1.9	2.3	.1	.90	-2.0	2.2	.1	.89	-2.0	2.3
Education 1982 < High School	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table B.4 (Continued).

Independent Variables 82	1 2-way Interaction Race/Ethnicity*Religious Attend				1 2-way Interaction Child #*Religious Attendance				2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Children # in Household 1982: >=2	-1.4	.06	-2.9	.1	-3.0	.04	-5.8	-.1	-3.2	.03	-6.0	-.3
Children # in Household 1982 = 1	.0	.96	-1.3	1.2	-.8	.49	-3.0	1.5	-.8	.50	-3.0	1.5
Children # in Household 1982 = 0	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time 1981	-.3	.53	-1.3	.7	-.2	.69	-1.2	.8	-.2	.66	-1.2	.8
Work Part-Time 1981	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Net Family Income 1981 Missing	-.9	.18	-2.2	.4	-1.0	.14	-2.3	.3	-.9	.16	-2.2	.4
Net Family Income 1981 Top 25%	-1.0	.12	-2.3	.3	-1.0	.13	-2.3	.3	-1.0	.12	-2.3	.3
Net Family Income 1981 Mid 50%	-.6	.30	-1.6	.5	-.6	.25	-1.7	.4	-.6	.28	-1.6	.5
Net Family Income 1981 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence 1982: Rural	.4	.51	-.7	1.4	.3	.53	-.7	1.4	.3	.57	-.7	1.4
Residence 1982: Urban	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region 1982: West	-.2	.71	-1.6	1.1	-.4	.58	-1.7	1.0	-.3	.66	-1.6	1.0
Region 1982: South	-.6	.33	-1.8	.6	-.7	.24	-1.9	.5	-.6	.31	-1.8	.6
Region 1982: North Central	.3	.65	-.9	1.5	.2	.77	-1.0	1.4	.2	.73	-1.0	1.4
Region 1982: Northeast	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table B.4 (Continued).

Independent Variables 82	1 2-way Interaction Race/Ethnicity*Religious Attend				1 2-way Interaction Child #*Religious Attendance				2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Rel. Attend 1982 >1/Wk* Hispanic	-1.4	.54	-5.7	3.0					-1.1	.61	-5.6	3.3
Rel. Attend 1982 >1/Wk* African American	-2.6	.21	-6.6	1.5					-2.4	.25	-6.4	1.7
Rel. Attend 1982 >1/Wk*Caucasian	0(a)	.	.	.					0(a)	.	.	.
Rel. Attend 1982 1/Wk*Hispanic	-2.6	.14	-6.0	.9					-2.9	.10	-6.4	.5
Rel. Attend 1982 1/Wk* African American	-5.5	.00	-8.5	-2.5					-5.5	.00	-8.5	-2.5
Rel. Attend 1982 1/Wk* Caucasian	0(a)	.	.	.					0(a)	.	.	.
Rel. Attend 1982 1-3/Mth* Hispanic	.0	.98	-3.3	3.2					-.1	.94	-3.4	3.2
Rel. Attend 1982 1-3/Mth* African American	-2.5	.06	-5.1	.1					-2.4	.07	-5.0	.2
Rel. Attend 1982 1-3/Mth*Caucasian	0(a)	.	.	.					0(a)	.	.	.
Rel. Attend 1982 Infreq * Hispanic	-.3	.86	-3.2	2.7					-.9	.55	-3.8	2.1
Rel. Attend 1982 Infreq * African American	-.3	.80	-2.8	2.2					-.9	.48	-3.4	1.6
Rel. Attend 1982 Infreq.* Caucasian	0(a)	.	.	.					0(a)	.	.	.
Rel. Attend 1982 None* Hispanic	0(a)	.	.	.					0(a)	.	.	.
Rel. Attend 1982 None * African American	0(a)	.	.	.					0(a)	.	.	.
Rel. Attend 1982 None* Caucasian	0(a)	.	.	.					0(a)	.	.	.

Table B.4 (Continued).

Independent Variables 82	1 2-way Interaction Race/Ethnicity*Religious Attend				1 2-way Interaction Child #*Religious Attendance				2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Rel. Attend 1982 >1/Wk * >=2 Child# 82					-1.8	.51	-7.1	3.5	-1.5	.58	-6.9	3.9
Rel. Attend 1982 >1/Wk * 1 Child#82					-2.2	.37	-6.9	2.6	-2.2	.36	-6.9	2.5
Rel. Attend 1982 >1/Wk * 0 Child#82					0(a)	.	.	.	0(a)	.	.	.
Rel. Attend 1982 1/Wk* >= 2 Child#82					3.0	.17	-1.2	7.3	3.2	.14	-1.0	7.5
Rel. Attend 1982 1/Wk * 1 Child#82					1.3	.47	-2.2	4.8	1.3	.47	-2.2	4.8
Rel. Attend 1982 1/Wk * 0 Child#82					0(a)	.	.	.	0(a)	.	.	.
Rel. Attend 1982 1-3/Mth* >=2 Child#82					-.8	.68	-4.6	3.0	-.6	.76	-4.4	3.2
Rel. Attend 1982 1-3/Mth * 1 Child#82					.6	.69	-2.4	3.6	.7	.64	-2.3	3.8
Rel. Attend 1982 1-3/Mth * 0 Child#82					0(a)	.	.	.	0(a)	.	.	.
Rel. Attend 1982 Infreq.* >=2 Child#82					4.8	.01	1.3	8.2	4.7	.01	1.2	8.2
Rel. Attend 1982 Infreq * 1 Child#82					2.1	.15	-.7	4.9	1.9	.20	-1.0	4.7
Rel. Attend 1982 Infreq * 0 Child#82					0(a)	.	.	.	0(a)	.	.	.
Rel. Attend 1982 None* >=2 Child#82					0(a)	.	.	.	0(a)	.	.	.
Rel. Attend 1982 None * 1 Child#82					0(a)	.	.	.	0(a)	.	.	.
Rel. Attend 1982 None * 0 Child#82					0(a)	.	.	.	0(a)	.	.	.

^a This parameter is set to zero because it is redundant.

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

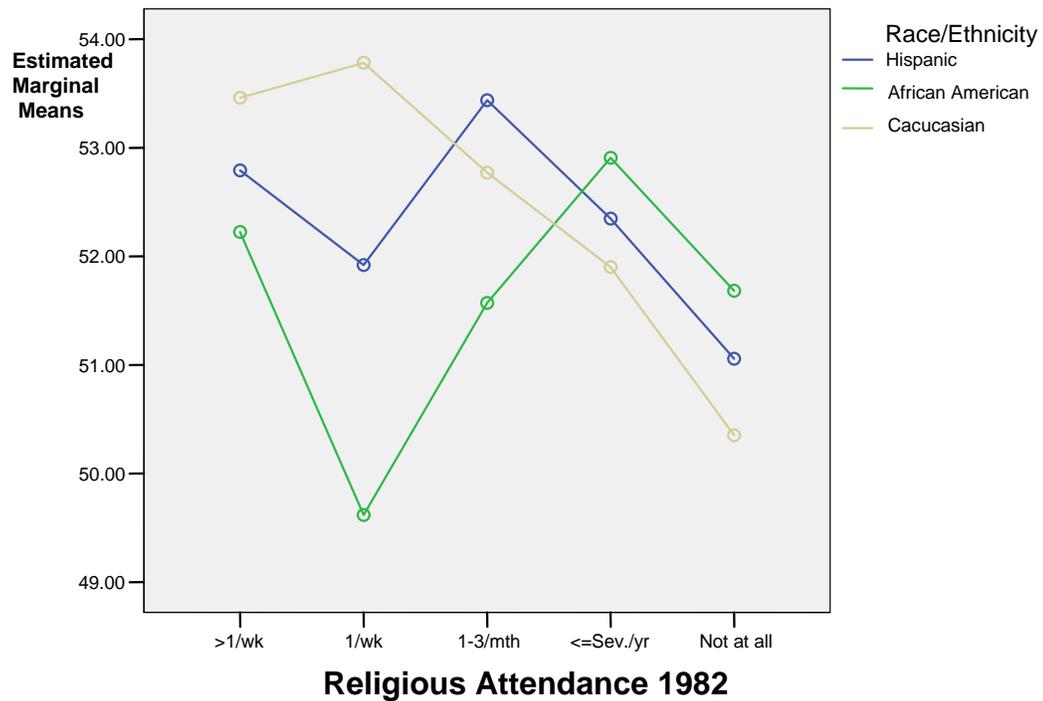


Figure B.4 Obj. II. One Two-way Interaction of Race/Ethnicity with Religious Attendance in 1982 in the Complete Model of the Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

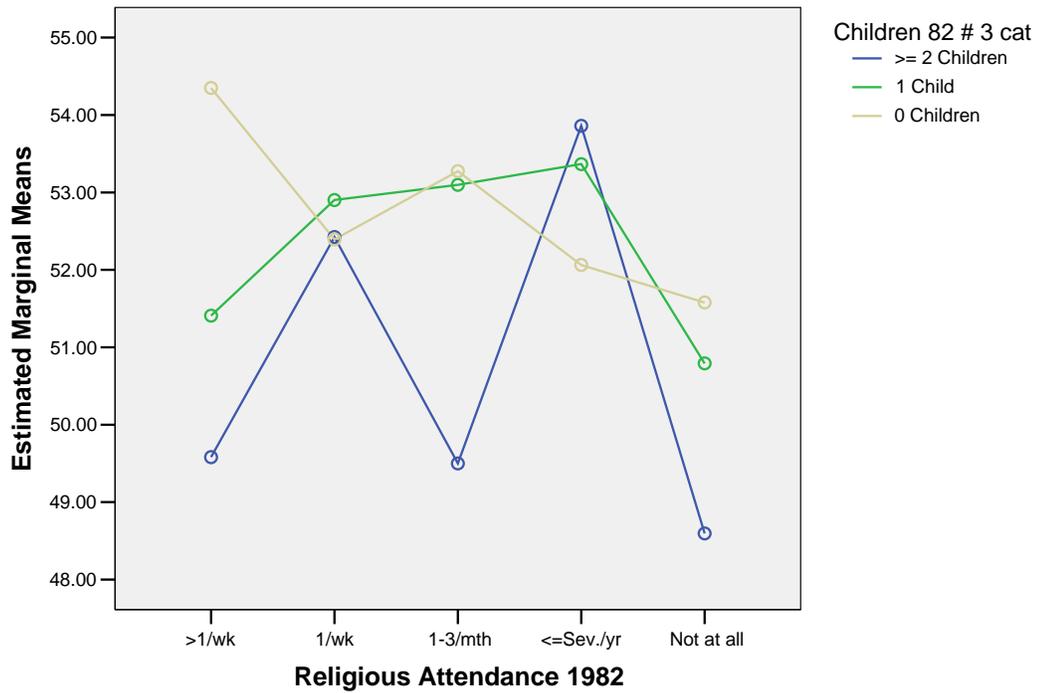


Figure B.5 Obj. II. One Two-way Interaction of Number of Children Living in the Household in 1982 with Religious Attendance in 1982 in the Complete Model of Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

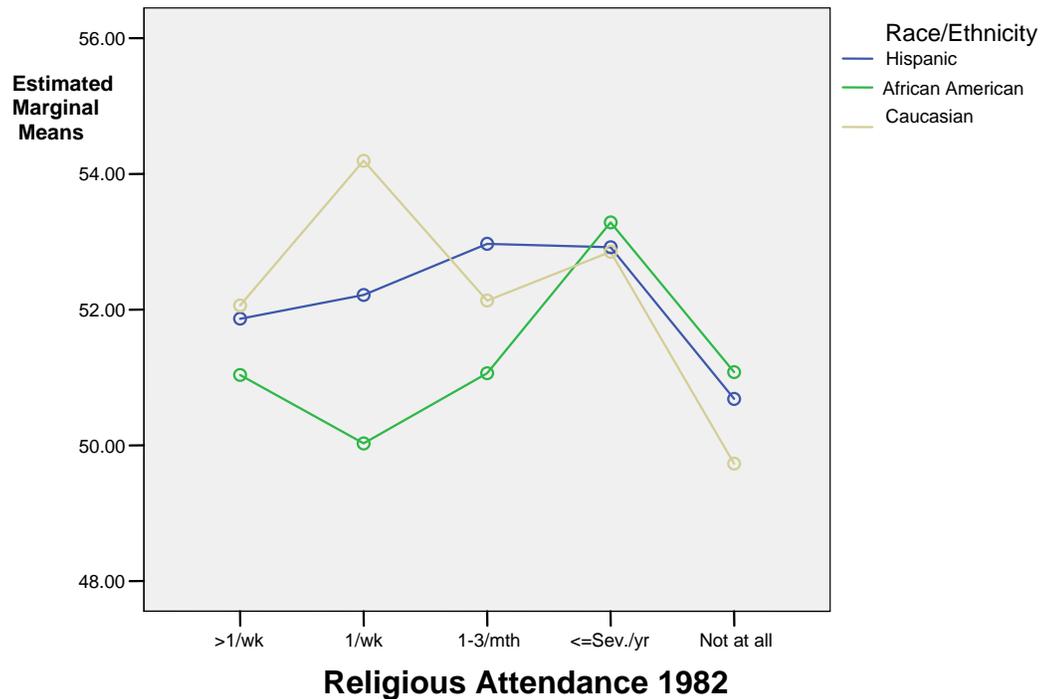


Figure B.6 Obj. II. One Two-way Interaction of Race/Ethnicity with Religious Attendance in 1982 in the Presence of the One Two-Way Interaction of Number of Children Living in the Household in 1982 by Religious Attendance in 1982 in the Complete Model of Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

**Estimated Marginal Means of Mental Health Composite Score (SF-12, MCS)
2000**

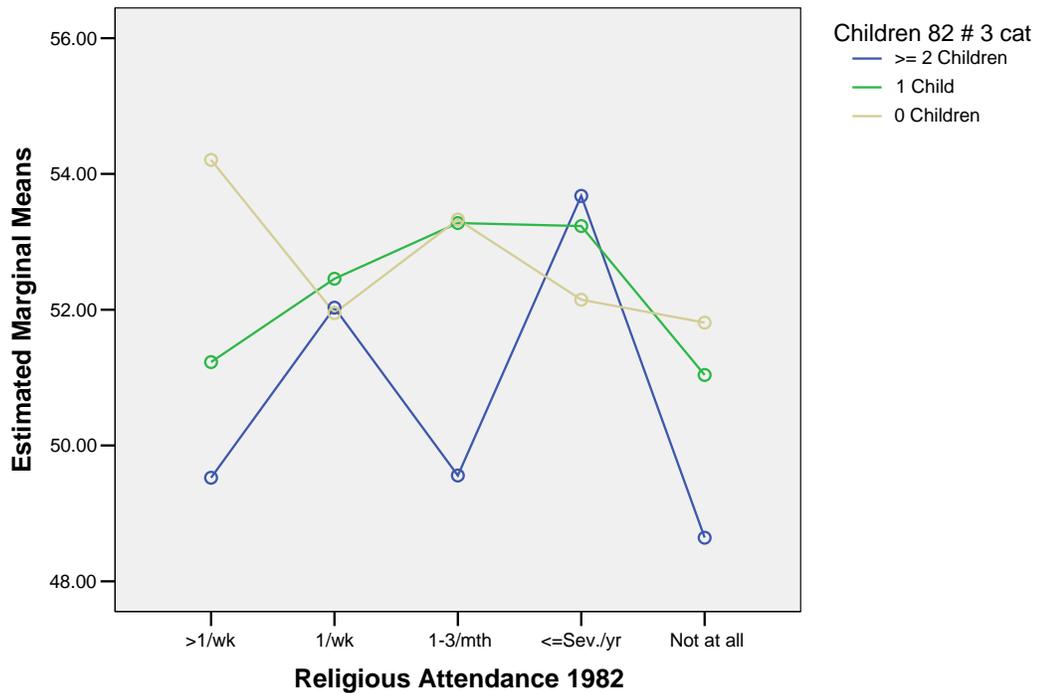


Figure B.7 Obj. II. One Two-way Interaction of Number of Children Living in the Household in 1982 with Religious Attendance in 1982 in the Presence of the One Two-way interaction of Race/Ethnicity with Religious Attendance in 1982 in the Complete Model of Mental Health Composite Score (SF-12 MCS) in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Table B.5 Obj. II. ANOVA of the Complete Model of CES-Depression Score in 2000 by One Two-way Interaction of Religious Attendance in 1982 with Race/Ethnicity, and Religious Attendance in 1982 with Number of Children Living in the Household in 1982; and Two Two-way Interactions of Religious Attendance in 1982 with Race/Ethnicity and Religious Attendance in 1982 with Number of Children Living in the Household in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 1982 Source	1 2-way Interaction Race/Ethnicity*Religious Attend			1 2-way Interaction Child #*Religious Attendance			2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance		
	df	F	Sig.	df	F	Sig.	df	F	Sig.
Corrected Model	29	5.1	.00	29	5.0	.00	37	4.5	.00
Intercept	1	165.9	.00	1	172.4	.00	1	173.7	.00
Religious Attendance (RA) 1982	4	1.0	.43	4	1.9	.11	4	1.1	.33
Health Could Limit Amt/Kind Work 1981	1	17.4	.00	1	15.8	.00	1	17.0	.00
Gender	1	13.5	.00	1	13.7	.00	1	13.3	.00
Race/Ethnicity	2	10.0	.00	2	6.8	.00	2	9.4	.00
Marital 1982	2	.4	.65	2	.2	.80	2	.3	.74
Education 1982	1	.1	.73	1	.2	.66	1	.1	.73
Child # in Household 1982	2	8.2	.00	2	9.8	.00	2	10.4	.00
Work Amount 1981	1	.7	.41	1	1.3	.26	1	1.2	.27
Net Family Income 1981	3	1.0	.40	3	.9	.43	3	1.1	.36
Residence 1982	1	.4	.50	1	.5	.50	1	.5	.49
Region 1982	3	2.5	.05	3	3.2	.02	3	2.8	.04
RA82*Race/Ethnicity	8	2.9	.00				8	2.4	.01
RA82*Child#82				8	2.7	.01	8	2.2	.02
Error	1803			1803			1795	4.5	.00
Total	1833			1833			1833	173.7	.00
Corrected Total	1832			1832			1832	1.1	.33
a Adj. R Squared	0.061			0.060			0.066		

Table B.6 Obj.II. Parameter Estimates of the Complete Model CES-Depression Score in 2000 by One Two-way Interaction of Religious Attendance in 1982 with Race/Ethnicity, and Religious Attendance in 1982 with Number of Children Living in the Household in 1982; and Two Two-way Interactions of Religious Attendance with Race/Ethnicity, and Religious Attendance in 1982 with Number of Children Living in the Household in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

Independent Variables 82	1 2-way Interaction Race/Ethnicity*Religious Attend				1 2-way Interaction Child #*Religious Attendance				2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Intercept	2.7	.00	1.3	4.0	2.4	.00	1.1	3.8	2.7	.00	1.4	4.1
Rel. Attend. 1982 >1/wk (RA)	-2.0	.00	-3.2	-.8	-1.7	.00	-2.7	-.7	-2.4	.00	-3.7	-1.2
Rel. Attend 1982 1/wk	-1.4	.00	-2.3	-.5	-.4	.31	-1.2	.4	-1.2	.01	-2.2	-.3
Rel. Attend 1982 1-3x/mth	-1.3	.00	-2.1	-.5	-1.0	.00	-1.7	-.3	-1.5	.00	-2.3	-.6
Rel. Attend 1982 <=Sev.x/yr (Infreq.)	-.6	.11	-1.3	.1	-.3	.30	-1.0	.3	-.5	.21	-1.2	.3
Rel. Attend 1982 not at all	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
81 Hlh Limits Work: Yes	1.9	.00	1.0	2.8	1.8	.00	.9	2.7	1.9	.00	1.0	2.8
81 Hlh Limits Work: No	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Gender: Female	.8	.00	.4	1.2	.8	.00	.4	1.2	.8	.00	.4	1.2
Gender: Male	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Race/Ethnicity: Hispanic	-.5	.34	-1.7	.6	.4	.23	-.2	.9	-.6	.33	-1.7	.6
Race/Ethnicity: African American	.3	.48	-.6	1.3	.9	.00	.4	1.4	.3	.52	-.6	1.3
Race/Ethnicity: Caucasian and all others	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Marital 1982: Divorce/Sep./Widow	-.2	.63	-1.1	.7	-.1	.78	-1.0	.7	-.1	.78	-1.0	.7
Marital 1982: Married	-.3	.37	-.8	.3	-.2	.51	-.7	.4	-.2	.44	-.8	.3
Marital 1982: Never Married	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Education 1982: >=High School	-.2	.73	-1.2	.9	-.2	.66	-1.3	.8	-.2	.73	-1.2	.9
Education 1982 < High School	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table B.6 (Continued).

Independent Variables 82	1 2-way Interaction Race/Ethnicity*Religious Attend				1 2-way Interaction Child #*Religious Attendance				2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Children # 1982: >=2	1.4	.00	.7	2.2	1.5	.03	.1	3.0	1.7	.02	.3	3.1
Children # 1982 = 1	.9	.01	.2	1.5	.5	.40	-.6	1.6	.6	.33	-.6	1.7
Children # 1982 = 0	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Work Full-Time 1981	-.2	.41	-.7	.3	-.3	.26	-.8	.2	-.3	.27	-.8	.2
Work Part-Time 1981	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Net Family Income 1981 Missing	.4	.23	-.2	1.0	.4	.20	-.2	1.1	.4	.19	-.2	1.1
Net Family Income 1981 Top 25%	.5	.10	-.1	1.2	.5	.13	-.1	1.1	.5	.09	-.1	1.2
Net Family Income 1981 Mid 50%	.3	.23	-.2	.9	.3	.21	-.2	.9	.3	.21	-.2	.9
Net Family Income 1981 Lowest 25%	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Residence 1982: Rural	-.2	.50	-.7	.3	-.2	.50	-.7	.3	-.2	.49	-.7	.3
Residence 1982: Urban	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.
Region 1982: West	.5	.15	-.2	1.2	.6	.10	-.1	1.2	.5	.13	-.1	1.2
Region 1982: South	.8	.01	.2	1.4	.9	.00	.3	1.5	.9	.00	.3	1.5
Region 1982: North Central	.6	.06	.0	1.2	.6	.05	.0	1.2	.6	.05	.0	1.2
Region 1982: Northeast	0(a)	.	.	.	0(a)	.	.	.	0(a)	.	.	.

Table B.6 (Continued).

Independent Variables 82	1 2-way Interaction Race/Ethnicity*Religious Attend				1 2-way Interaction Child #*Religious Attendance				2 2-way Interaction Race/Ethnicity*Religious Attend. and Child#*Religious Attendance			
	B	Sig.	CI	95%	B	Sig.	CI	95%	B	Sig.	CI	95%
Rel. Attend 1982 >1/Wk* Hispanic	2.0	.07	-.2	4.1					1.6	.16	-.6	3.8
Rel. Attend 1982 >1/Wk* African American	1.9	.06	-.1	3.9					1.7	.09	-.3	3.7
Rel. Attend 1982 >1/Wk*Caucasian	0(A)	.	.	.					0(A)	.	.	.
Rel. Attend 1982 1/Wk*Hispanic	1.4	.11	-.3	3.1					1.5	.09	-.2	3.2
Rel. Attend 1982 1/Wk* African American	2.1	.01	.6	3.6					2.1	.01	.6	3.6
Rel. Attend 1982 1/Wk* Caucasian	0(A)	.	.	.					0(A)	.	.	.
Rel. Attend 1982 1-3/Mth* Hispanic	1.1	.18	-.5	2.7					1.0	.23	-.6	2.6
Rel. Attend 1982 1-3/Mth* African American	1.2	.06	-.1	2.5					1.1	.08	-.2	2.4
Rel. Attend 1982 1-3/Mth*Caucasian	0(A)	.	.	.					0(A)	.	.	.
Rel. Attend 1982 Infreq * Hispanic	1.0	.16	-.4	2.5					1.2	.12	-.3	2.6
Rel. Attend 1982 Infreq * African American	-.6	.37	-1.8	.7					-.4	.57	-1.6	.9
Rel. Attend 1982 Infreq.* Caucasian	0(A)	.	.	.					0(A)	.	.	.
Rel. Attend 1982 None* Hispanic	0(A)	.	.	.					0(A)	.	.	.
Rel. Attend 1982 None * African American	0(A)	.	.	.					0(A)	.	.	.
Rel. Attend 1982 None* Caucasian	0(A)	.	.	.					0(A)	.	.	.

Table B.6 (Continued).

Independent Variables 82	1 2-Way Interaction Race/Ethnicity*Religious Attend				1 2-Way Interaction Child #*Religious Attendance				2 2-Way Interaction Race/Ethnicity*Religious Attend. And Child#*Religious Attendance			
	B	Sig.	Ci	95%	B	Sig.	Ci	95%	B	Sig.	Ci	95%
Rel. Attend 1982 >1/Wk * >=2 Child#82					2.5	.06	-1	5.2	2.2	.11	-5	4.8
Rel. Attend 1982 >1/Wk * 1 Child#82					1.7	.15	-6	4.1	1.7	.16	-7	4.0
Rel. Attend 1982 >1/Wk * 0 Child#82					0(A)	.	.	.	0(A)	.	.	.
Rel. Attend 1982 1/Wk* >= 2 Child#82					-1.2	.28	-3.3	.9	-1.3	.22	-3.5	.8
Rel. Attend 1982 1/Wk * 1 Child#82					-4	.68	-2.1	1.4	-4	.64	-2.1	1.3
Rel. Attend 1982 1/Wk * 0 Child#82					0(A)	.	.	.	0(A)	.	.	.
Rel. Attend 1982 1-3/Mth* >=2 Child#82					1.2	.19	-6	3.1	1.0	.30	-9	2.9
Rel. Attend 1982 1-3/Mth * 1 Child#82					.8	.27	-7	2.4	.7	.38	-8	2.2
Rel. Attend 1982 1-3/Mth * 0 Child#82					0(A)	.	.	.	0(A)	.	.	.
Rel. Attend 1982 Infreq.* >=2 Child#82					-1.6	.06	-3.3	.1	-1.6	.08	-3.3	.2
Rel. Attend 1982 Infreq * 1 Child#82					.0	.96	-1.4	1.4	.2	.83	-1.3	1.6
Rel. Attend 1982 Infreq * 0 Child#82					0(A)	.	.	.	0(A)	.	.	.
Rel. Attend 1982 None* >=2 Child#82					0(A)	.	.	.	0(A)	.	.	.
Rel. Attend 1982 None * 1 Child#82					0(A)	.	.	.	0(A)	.	.	.
Rel. Attend 1982 None * 0 Child#82					0(A)	.	.	.	0(A)	.	.	.

^a This parameter is set to zero because it is redundant.

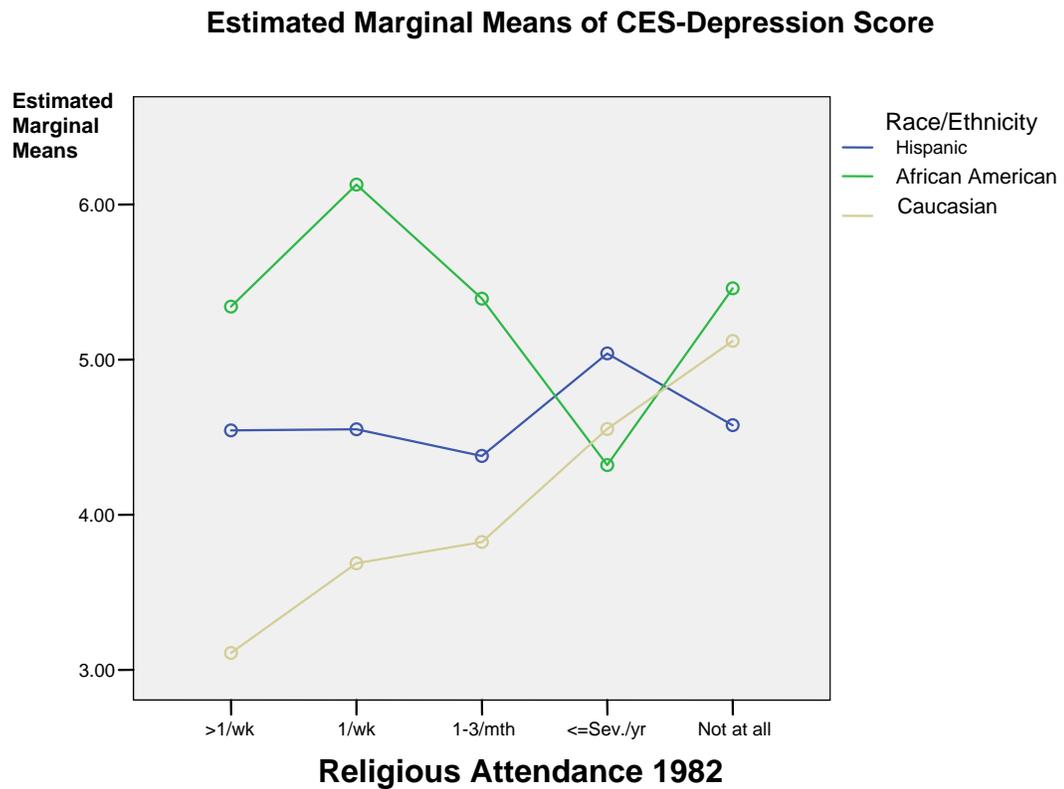


Figure B.8 Obj. II. CES-Depression (CES-D) Score in 2000 by One Two-way Interaction of Religious Attendance in 1982 with Race/Ethnicity (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

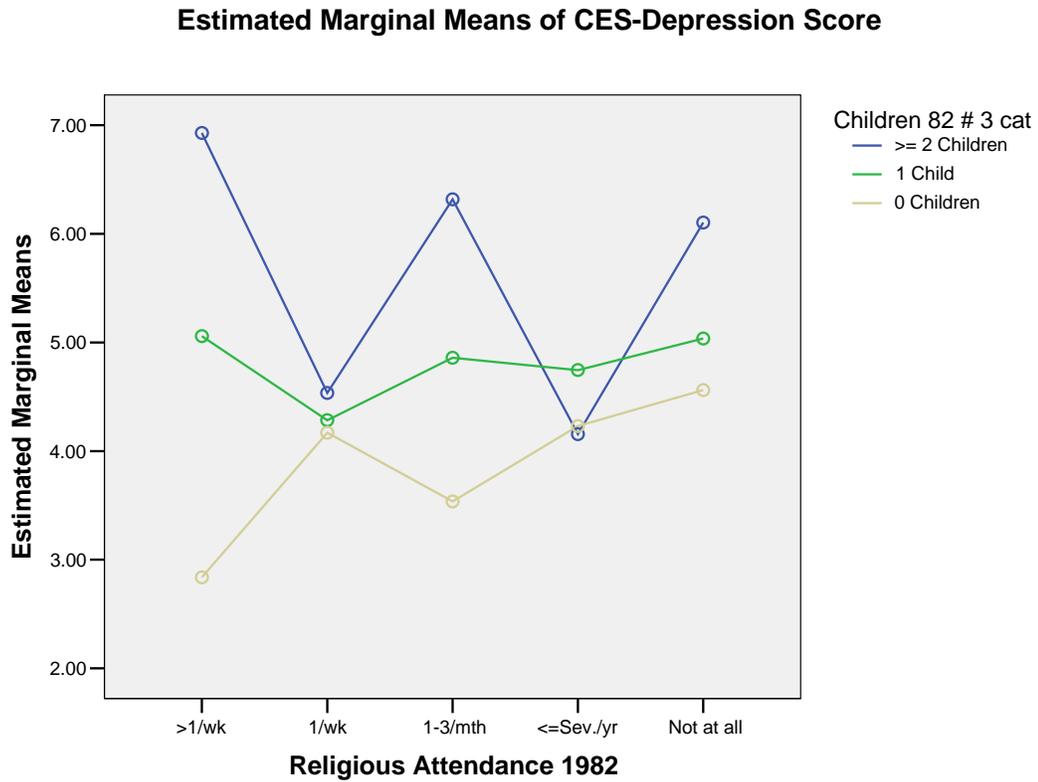


Figure B.9 Obj. II. CES-Depression (CES-D) Scores in 2000 by One Two-way Interaction of Religious Attendance in 1982 with Number of Children Living in the Household (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

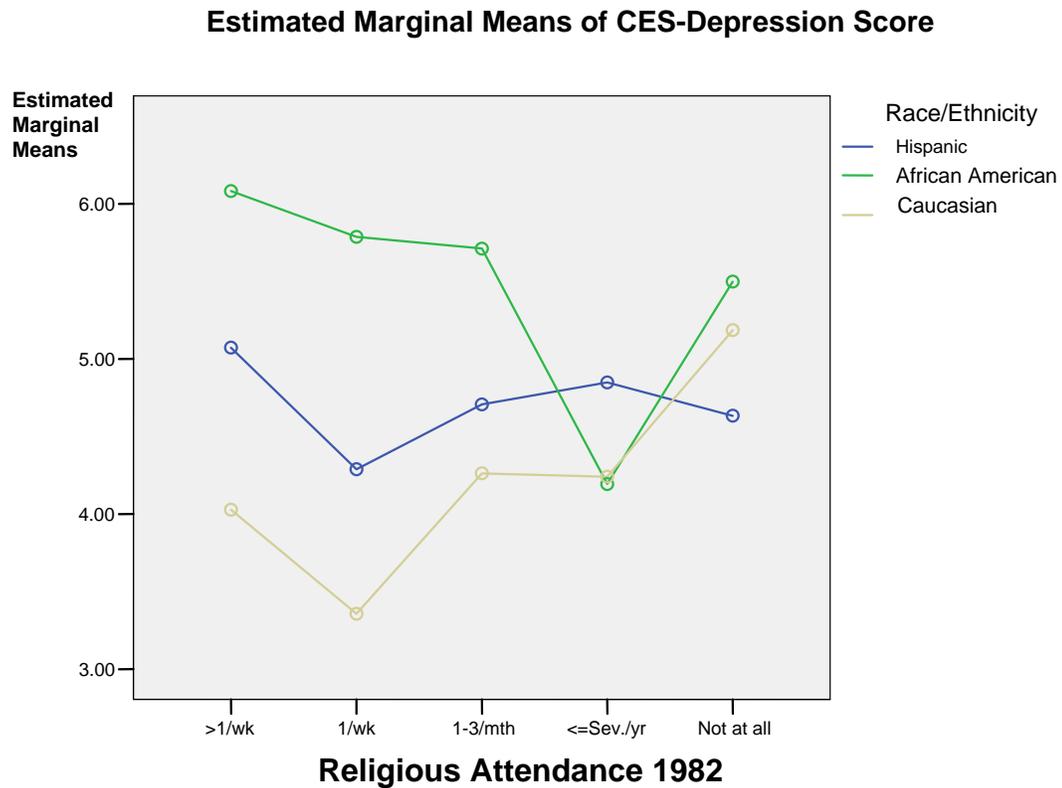


Figure B.10 Obj. II. Two two-way Interactions of Race/Ethnicity with Religious Attendance in 1982 in the presence of the Interaction of Number of Children Living in the Household in 1982 with Religious Attendance in 1982 in the Complete Model of CES-Depression Score in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

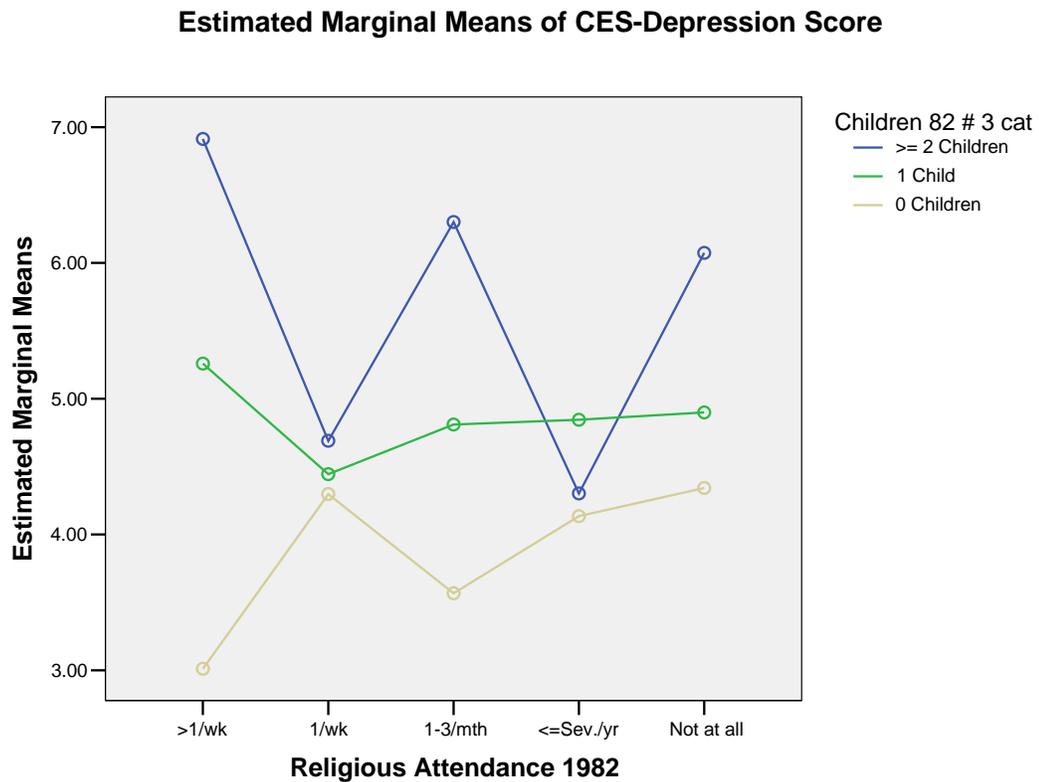


Figure B.11 Obj. II. Two two-way Interactions of Children Number Living in Household in 1982 with Religious Attendance in 1982 in the Presence of the Interaction of Race/Ethnicity with Religious Attendance in 1982 in the Complete Model of CES-Depression Score in 2000 by Religious Attendance in 1982 (controlling for sociodemographic variables in 1982 of gender, race/ethnicity, marital status, education, number of children living in the household, work amount in 1981, net family income in 1981, residence and region).

APPENDIX C
Quantitative Results
Objective III

Beliefs and Health Study**Consent Form**

You are invited to participate in a research study on the relationship between socio-cultural beliefs (particularly religious, spiritual, local or personal belief systems) and health. You were selected as a possible participant because of your professional or personal experience. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

Background Information: The purpose of this study is to obtain the most current information from an international perspective on the effects of socio-cultural beliefs (particularly those that belong to religious, spiritual, local or personal belief systems) on health.

Procedures: If you agree to be in this study, we will ask you to be an interviewee and respond to a series of inquiries related to the topic of beliefs and health. The interview will range from a minimum of 30 minutes to a maximum of 60 minutes. The interview is expected to occur once and if necessary a follow-up interview or interviews (in person, by phone or by e-mail) will be requested for additional information or clarification of initial responses.

Risks and Benefits of Participation in the Study: I do not anticipate that any risks will arise from your participation in this study, other than those encountered in day-to-day life. There are no direct benefits from participating in the study. Indirect benefits from participation may be found in your contributing timely information to the body of knowledge pertaining to emerging themes and concepts that frame the relationship

between beliefs and health from an international perspective or from your contribution to our understanding of the most current humanitarian and health projects with a socio-cultural belief component.

Voluntary Nature of Participation: Your decision whether or not to participate will not affect your current or future relations with Cornell University or with other cooperating entities. If you decide to participate, you are free to withdraw at any time without affecting those relationships. You may also skip any questions in responding to which you do not feel comfortable.

Confidentiality: The records of this study will be kept private. In any sort of report we may publish or present, if you request, we will not include any information that will make it possible to identify you (refer to signature request below). Research records, tape recordings and photographs will be kept in a locked cabinet file and computer file located in a secured locked room; only the researcher and dissertation committee of four faculty members will have access to the records. The records, tapes and any other material may be kept in perpetuity.

Contacts and Questions: The researcher conducting this study is Jennifer A. Nolan, Ph.D. candidate in the department of Policy Analysis and Management, College of Human Ecology at Cornell University. Please ask any questions you have now. If you have questions later, you may contact me at any time at e-mail address _____. E-mail is the best way to contact me. During the interview period, I will have access to a cell phone. You can attempt to contact me or leave a voice message at the following phone number: _____. and postal mailing address _____. (I can be contacted at the e-mail address at any time, and at the phone and mailing address

between _____ and _____.) My dissertation chair advisor is Eunice Rodriguez (e-mail: _____; phone number: _____; and postal mailing address: _____). If you have any questions or concerns regarding your rights as a subject in this study, you may contact the University Committee on Human Subjects (UCHS) of Cornell University at _____, or access their website at <http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm>. You will be given a copy of this form to keep for your records.

For each statement below, please check the appropriate response and sign and date.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to participate in the study.

Signature _____ Date _____

Statement of Consent for Audio taping Interview: I have read the above information. I consent to being audio taped for this study. Please check appropriate response and sign and date.

Signature _____ Date _____

Statement of Consent for Use of Identifying Information: I have read the above information. I consent to the use of identifying information (such as name and/or position) in regards to my responses for any future publications or presentations.

___ Yes

___ Approval Request: Only upon my approval of written text before submission for possible publication or presentation. (If I am unable to be contacted, I allow my responses to be published but with no identifying information.)

Signature _____ Date _____

This consent form was approved by the UCHS on June 17, 2004.

Interview Summary Guide to Key Themes Explored

Purpose of the Study:

I am conducting a study on the relationship between belief systems and health. For this part of the project, I am studying humanitarian organizations' health projects that may have a socio-cultural component, particularly the influence of the target population's belief systems (particularly religious, spiritual, personal or local beliefs) on health.

This project's aim is to obtain the most current information on the relationship between belief and health from an international perspective.

Consent:

Given your consent, this interview will be audio taped. I am going to ask you to read an informed consent form and ascertain whether you are willing to sign it before we begin the interview. The interview time duration is anticipated to be a minimum of 30 minutes and maximum of 60 minutes. Do you have any questions before we begin?

Script (Interview Description):

I will ask for background information about your professional position, responsibilities and experiences. Next I will ask about the background of the institution, including its mission, goals and objectives. Inquiries will include descriptions of types of humanitarian and health projects, their history and whether they have been evaluated. I will ask you about field experiences associated with the health projects with a socio-cultural component. I will ask you to share your thoughts about theories and possible mediating and causal mechanisms explaining the relationship between belief systems and health. Lastly, policy implications for the agency and governments at the international, national and community level and future recommendations will also be solicited during the interviews.

Key Themes to be Discussed in the Interview:

Professional Background information and experiences of interviewee:

- (1) Professional Position
- (2) Responsibilities
- (3) Experience/background in international humanitarian work
- (4) Experience/background in humanitarian or health programs with a socio-cultural component (specifically spirituality/religious/personal/local belief systems.)

Agency Background:

- (1) Mission of the agency, including goals and objectives
- (2) Background philosophy of the agency

Humanitarian or Health Projects:

- (1) Types of humanitarian (or health) projects of the agency
- (2) Types of humanitarian (or health projects) with a socio-cultural component (religious, spiritual or personal/local beliefs of the target populations of the humanitarian or health projects.)
- (3) History, implementation and evaluation (strengths, weaknesses) of such programs.
- (4) Experiences/outcomes of the projects
- (5) Definitions or conceptualizations of religiousness, spirituality, personal and local beliefs, and health including physical, mental, social and emotional health.

- (6) Mediating pathways and factors explaining the relationship between beliefs and health.
- (7) Comparison of similarities and differences in the relationship to beliefs and health among various populations (cultures/nations/local communities) where the humanitarian (or health) projects have been implemented.

Policy Implications and Recommendations:

- (1) Policies of the agency and government at the international, national and local community level that are supportive or not supportive of the relationship between beliefs and health.
- (2) Future recommendations/thoughts on international humanitarian (or health) projects with a socio-cultural belief component - in terms of research, projects, resources, cooperation, and policies.

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