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The interplay among religiosity, heath, and ethnicity : changing patterns in the U.S., 1972-2010

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THE INTERPLAY AMONG RELIGIOSITY, HEALTH, AND ETHNICITY: CHANGING PATTERNS IN THE U.S., 1972 - 2010

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ABSTRACT

Because ethnic minorities continue to experience health inequities in America, the powerful social forces that help determine our health become all the more relevant to explore. Within this social context, an often overlooked factor is the role that religiosity plays in influencing health. This investigation explored the relationships among religiosity, health, and ethnicity. Primary aims were to specify the change that has occurred over time in religiosity, health, and socio-demographic variables and to determine whether religiosity has a unique influence on health for each ethnic group. The General Social Survey, a large, nationally representative dataset was utilized. Comparisons of correlations (among health, religiosity, and socioeconomic variables)

across time revealed that in general, the relationship between religious attendance and health has strengthened, the relationship between education and health has weakened, and the relationships between socioeconomic variables and religiosity have strengthened. Particularly for ethnic minorities, socioeconomic factors have become stronger predictors of religiosity over time. Analyses of covariance of religious attendance and health were conducted separately. Main effects of ethnicity, age, gender and era were highly significant for both dependent variables. For religious attendance, all possible two-way interactions among ethnicity, age, gender, and era were significant as well. For example, ethnic differences in attendance were greater for middle age than for younger adults, were greater for women than for men, and were greater in the recent era than in the previous era. For subjective health, the two-way interactions of ethnicity by age, ethnicity by gender, ethnicity by era, and the three-way interaction of era by ethnicity by age were all significant. Most striking was the greater decline over eras in health of Latinos relative to that of other groups. Finally, the relationship between religiosity and health did not prove to differ significantly across ethnic groups; Although ethnic minorities are strongly religiously committed, the impact of religiosity on health is not stronger/more beneficial for ethnic minorities than for non-Latino Whites. In conclusion, the interplay among religiosity, health, and ethnicity is complex and ever evolving.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Introduction

Ethnic minorities continue to experience poorer health outcomes compared to non-Latino Whites. In light of the health inequities in our nation, examining how the social context (social environment) determines health is crucial. As a psychosocial factor within the social context that contributes to health, religiosity is too often overlooked, despite being an important aspect of life. How might investigating associations with religiosity give us more insight into health outcomes for ethnic minorities, particularly in addressing health inequities?

There are three main relationships at play: (1) the relationship between health and religion/religiosity, (2) the relationship between ethnicity and religion, and (3) the relationship between ethnicity and health. It is that interplay among these three main components (religiosity, heath, ethnicity), the dynamics that are involved, that are worth investigating to shed some light on ethnic minority health outcomes.

The prevalence of inequity in our society, which contributes to the racial/ethnic disparities in health, is inconsistent with our society's values of fairness and equality. It is now more important than ever to target the reason why health inequity persists. The goal of this research investigation is to explore the differences in health among ethnicities, placing primary focus on the role of religiosity in this relationship. The General Social Survey, a nationally representative data set, will be used to examine those relationships. The aim of this research investigation is to examine how the relationships among religiosity, health, and socio-demographic variables have changed over time from the early 1970's to recent years and also to explore the possibility that the impact of religiosity on health may differ across ethnic groups.

The relationship between religiosity and health

In current American culture, religion is a very important aspect of life. In 2007, when asked how important religion was in their life, a majority of Americans (56%) responded that it was "Very important" (Pew Forum on Religion & Public Life, 2008 February). It is evident that religion holds a position of priority in the lives of many Americans and in American culture generally, and could influence many aspects of life such as health and psychological well-being.

Research on religion and health has now established a solid association between the two, suggesting that religiosity has a significant impact on health. A growing body of evidence supports the positive associations between religious commitment and physical and mental health outcomes (Ellison & Levin, 1998; George, Ellison, & Larson, 2002; Koenig, McCullough, & Larson, 2001; Miller & Thoresen, 2003; Powell, Shahabi, & Thoresen, 2003).

Conceptualizing religiosity. Religion is, from one perspective, fundamentally a social phenomenon and a social institution identified with boundaries within which specific beliefs and practices are endorsed (Miller & Thoresen, 2003). At the same time, religion can also be individual and personal, such that there is a personal commitment and connection to these socially endorsed beliefs, practices, and precepts. Spirituality, in contrast, is generally a personally defined interaction with what is considered sacred or divine (Miller & Thoresen, 2003). Still, there is substantial overlap between religiosity and spirituality as they share some characteristics but retain their own uniqueness, which makes it difficult to disentangle the two. For the purposes of this research project, the

focus will be on religiosity, which is conceptualized as both social and personal, involving formal practices and beliefs and also personal experience with the divine.

The importance of religion for an individual is often manifested by how active he/she is in their faith. Religious participation can be measured in a variety of forms; however, there are four main dimensions that have been commonly utilized in previous research (George, Ellison, & Larson, 2002): (1) religious attendance, which is attending religious services and activities; (2) religious affiliation, which specifies group or denominational membership; (3) private religious practices, which includes personal activities such as prayer and meditation; and (4) religious coping, which means utilizing one's religion as a resource during trying times. The most widely used is religious attendance, because it captures something truly "religious," namely, manifesting a commitment to, and actively engaging in one's religion.

Religious attendance is one of the dimensions of religiosity with the strongest association with physical health, psychological well-being, and mortality (Ellison, 1995; Koenig, George, Cohen, et al., 1998). Additionally other dimensions of religiosity examined in past research are: social integration and support, meaning in life, forgiveness, and closeness to God. Given religion is a multi-faceted and multidimensional phenomenon, it is important to attempt to capture as much "religiosity" as possible, by examining multiple dimensions. Just as important as recognizing the multi-dimensional nature of religiosity is acknowledging that there are many influences on religiosity. It is important to consider how religiosity is intertwined with socioeconomic status, gender, age, ethnicity, and cultural factors, which adds to the complexity of religiosity.

Health benefits of religiosity. A strong religious commitment is linked with a variety of positive health outcomes. For the most part, religious faith that is active and salient to a person seems to be protective, producing better health outcomes. A few examples of the salubrious outcomes associated with religiosity will be highlighted. Religiosity can be protective against premature death, as higher religiosity was associated with a 30% reduction on mortality, even after controlling for demographic, socioeconomic, and health-related confounding variables (Powell, et al., 2003). In fact, there is evidence for a dose-response relationship, as increasing levels of religious attendance were related to decreasing risk of mortality (Musick, House, & Williams, 2004). Compared to individuals who never attend religious services and those who attend more than once a week, there is a seven-year difference in life expectancy at age 20, even after controlling for health status and other social and behavioral risk factors (Hummer, Rogers, Nam, & Ellison, 1999). Infrequent church attendance was related to significantly higher rates of death from circulatory, digestive, and respiratory problems (Oman, Kurata, Strawbridge, & Cohen, 2002). There is also evidence for better immune functioning and lower rates of cancer or better prognosis with greater religiosity (Koenig, McCullough, & Larson, 2001). Frequent attendance of religious services was also a strong predictor of better physical functioning for the elderly (Idler & Kasl, 1997).

Religious involvement has associations with more psychological aspects of health as well. More religious involvement is related to less depression, less anxiety, less alcohol and drug use and abuse (Koenig, McCullough, & Larson, 2001). Higher religiosity has also been associated with engaging in positive health behaviors, such as more physical activity and exercise, better diet, less cigarette smoking, greater likelihood

for participating in disease screenings, greater likelihood of complying with treatments, and more seat-belt use (Koenig, McCullough, & Larson, 2001). In a systematic review of the literature on the relationship between religious involvement and physical and psychological health, an overwhelming majority of studies have found significantly positive findings (Koenig, McCullough, & Larson, 2001).

It is also noteworthy that most research studying the relationship between happiness and religiosity has found a positive association; greater religious involvement is related to greater well-being and happiness (Koenig, McCullough, & Larson, 2001). Further, religious involvement is significantly related to reports of meaning and purpose in life, greater hope, and more optimism, forgiveness, altruism, gratitude, and kindness (Koenig, McCullough, & Larson, 2001), all of which have been linked to better physical health outcomes.

While there is much evidence linking health/well-being to religiosity positively, there is also some mixed evidence. This positive link between religion and health may not always be supported, as sometimes it has not reached significance, and at times, greater religiosity has been associated with worse outcomes. For example, while there is evidence that religiosity contributes to better cardiovascular health, there is also evidence that the relationship is weakened to non-significance when adjusted for confounding variables (Hummer et al., 1999). Religiosity's influence can be indirect, and the relationship between religion and cardiovascular health may be attributed to religion fostering in its adherents a healthier lifestyle, which in turn contributes to better cardiovascular health (Hummer et al., 1999).

Utilizing one's religion to cope with difficult life circumstances has been well researched. Religious coping has been shown to have both positive and negative effects on health. Positive religious coping (confident and constructive use of one's religion) is associated with more positive outcomes, whereas negative religious coping (religious struggle and doubt) seems to lead to increased depression and anxiety (Koenig et al., 1992). The variability in the findings creates some ambiguity in what the unique influence of religion is on health and well-being for various individuals and groups.

The nature of the relationship between religion and health. Because there are many forms in which the health-related benefits of religiosity manifest themselves, it is necessary to examine the nature of the relationship. How does religiosity (in any form) influence health? One of the main and pivotal questions is: Does religion play a causal role in this relationship between religiosity and health (Levin, 1994)? In recent years, research has been redirected from establishing a connection to attempting to explain *why* there is a connection between religiosity and health, to provide evidence for *how* religiosity is able to contribute to better health outcomes.

The many perspectives, with cross-disciplinary contributions, of the research on religiosity and health give it richness, however, it is also an obstacle to pinpointing the unique influence of religion (Krause, 2011). There is lack of communication among the multiple disciplines that examine the relationship between religion and it is difficult for research to build on previous work and for evidence to be synthesized and organized (Krause, 2011). Ultimately, this field of research needs to be directed toward developing a conceptual model to unify and establish a framework for the role of religion in health (Krause, 2011).

Despite the lack of a unifying, conceptual model of the relationship between religion and health, it may be conjectured that there may be either a mediation or a moderation effect at work, and exploring these may help us move toward explanatory models for why and how religiosity impacts health. In mediation, there is another factor that stands in between religion and some health outcome, suggesting that this other factor has the direct link to that health outcome, and is a mechanism by which religion influences health. For example, religion may be linked with better health because it could be foster better stress management skills. Therefore it would be the mechanism of better coping with stressors that is directly related to more favorable health outcomes and not religion per se. In moderation, religion interacts with some other important factor to predict health. The nature of this relationship implies that religion does not have a consistent influence on health, and instead suggests that considering the way in which religion's association with health changes across different subgroups would result in being more effective at predicting health than if religion were considered alone. To give a hypothetical example, while religion may be related to better health outcomes overall, there might be a different impact when religiosity and gender are considered together. For men, there might be a moderate positive effect, but for women, there may be more defined and stronger positive health outcomes.

Religiosity can be immense and too multi-faceted to examine all at once, but previous research has highlighted several active ingredients of religiosity, which may act as mediators or mechanisms through which religiosity is beneficial for health. They include (1) regulation of individual lifestyles and health behaviors, (2) provision of social resources, (3) promotion of positive self-perceptions, (4) provision of specific coping

resources, (5) generation of other positive emotions, (6) promotion of healthy beliefs, and (7) additional hypothesized mechanisms, such as the existence of a healing bioenergy (Ellison & Levin, 1998). Because religious participation tends to promote healthy lifestyles and healthy behaviors, being religious might be expected to have positive effects on longevity and health (George et al., 2002). Many aspects of the religious life are social; therefore social mechanisms through which religion is beneficial to health are plausible. Being part of a faith community brings up opportunities to develop social ties with people who share a similar worldview; therefore social support may be another mechanism (George et al., 2002). Religious social support may even be deeper and more rewarding than secular social support (Powell et al., 2003).

The worldview or global meaning in life that develops from a religious foundation is related to believing and knowing there is meaning and purpose behind all things. This may enable religious people to better cope with stress, loss, frustrations, and painful life events, making them less likely to suffer from stress-related illnesses (George et al., 2002). Using one's faith confidently and constructively during trying times is positive religious coping, which may buffer the negative effects of stress (George et al., 2002). Being religious may also foster the development of many psychosocial resources and traits, such as gratitude, optimism, compassion, or experiencing more positive emotions, greater self-esteem, greater marital stability, etc. (Koenig, et al., 2001).

While it is practically impossible to investigate, the supernatural force and influence of religion and the transcending power of having an intimate relationship with God are undeniable to an authentically religious person. Certain aspects of religion are more easily conceptualized and more amenable to research investigations than others.

Unfortunately, religiosity taken in its entirety is too overwhelming to conceptualize and investigate; however, it is possible take a focused perspective. For the current investigation, an operationalization of religion in terms of religious attendance and subjective religiosity will allow its influence on health to be explored in terms of its interaction with other factors, such as ethnicity and social demographic factors.

Caution regarding the purported benefits of religion. There are a few points of caution worth mentioning. Despite the potential for great health benefits of greater religiosity, religion should not and cannot be prescribed as a panacea or a cure or in place of treatment. It would be unreasonable and irresponsible to conceptualize religiosity as a health resource out of context. The "Health and wealth gospel" or the "Prosperity theology" is one of the principal components of the "Faith Movement," which is a strand of neo-Pentecostalism that has achieved global influence across many cultures (Hunt, 2000). That "health and wealth" in life should be expected by a truly religious person is a misguided theory. It is misguided by implying that religion is primarily something to be utilized for obtaining other goals, such as health. There are no guarantees that adding religion to one's life will result in a perfect life. Research on religion and health is meant to learn more about how an authentic and personally meaningful religious commitment is linked with positive health outcomes. That is more than a mere pleasant side effect, but what are the interactions and mechanisms that allow for this relationship?

The relationship between ethnicity and religion

Religion can be a significant aspect of culture and cultural identity. This is especially true for ethnic minorities. Taking the nation as a whole, religion remains an important and prominent aspect of American culture. However, when focusing

specifically on ethnic minorities, Hispanics and African Americans hold religion in even higher regard than Americans do as a whole.

Latinos and religion. In only a few years, the Latino population in the U.S. has grown drastically, accounting for more than half (56%) of the nation's growth in the past decade (2000 to 2010) (Pew Hispanic Center, 2011 May). This makes Latinos currently the nation's largest ethnic or racial minority group, accounting for 16.3% of the total population according to the 2010 U.S. Census (United States Census Bureau, 2011 May). The population includes about 10% native-born Latinos and 6% foreign-born Latinos (Pew Hispanic Center, 2011 February). Being such a substantial part of the population, Latinos are transforming the religious landscape of the nation through their distinctive way of practicing Christianity, including the rise of Latino-oriented churches across the country.

The religious composition of the Latino population is distinctive, with an overwhelming majority (68%) affiliating with the Catholic tradition, 20% identifying as Protestant, followed by 8% as secular, 3% as other Christian, and 1% as other faiths (Pew Forum on Religion and Public Life, 2007 April). Religious attendance for Latinos is generally high, as 44% of Latinos attend religious services at least once a week (Pew Forum on Religion and Public Life, 2007 April). While 70% of Latino Evangelicals attend once a week or more, 42% of Latino Catholics attend weekly or more (Pew Forum on Religion and Public Life, 2007 April).

The majority of Latinos attend ethnic oriented churches, which are characterized by leadership from Latino clergy, services in Spanish, and a primarily Latino congregation. Of Latino church-goers, 70% of those who are Catholic and 62% of those

who are Protestant attend ethnic oriented churches (The Pew Forum on Religion and Public Life, 2007 April). Spanish-oriented worship is popular among foreign-born, Spanish-speaking Latinos, but also for native-born, English-speaking Latinos, which suggests that ethnic-oriented worship has deeper roots than merely language in the cultural identification of Latinos (The Pew Forum on Religion and Public Life, 2007 April).

For the majority of Latinos, religion is an important part of everyday life. Latinos pray more frequently than others, as 68% of Latinos pray at least once a day compared to 58% of the U.S. population (Pew Forum on Religion and Public Life, 2007 April). Latino evangelicals (80%) and Latino Catholics (59%) are basically no more likely to pray daily than all evangelicals (78%) and Catholics (58%), respectively (Pew Forum on Religion & Public life, 2009 June). Even among unaffiliated individuals, 33% of Latinos pray every day compared to 22% of the whole unaffiliated population (Pew Forum on Religion & Public life, 2009 June). Homes of Latino families tend to have religious objects, such as a bible, a saint, a rosary, religious artwork, and other religious artifacts (Pew Forum on Religion and Public Life, 2007 April). For Hispanics, religion seems to be at the root of culture and ethnic identity.

For about half (55%) of Latino Catholics, Spanish is their first language and over two-thirds (68%) are immigrants (Pew Forum on Religion & Public Life, 2009 June). For about 63% of Latino Evangelicals, their primary language is English or they are bilingual and a large percentage (46%) are native-born (Pew Forum on Religion & Public Life, 2009 June). First-generation Latino immigrants tend to hold on to their traditional Catholic faith (68%) (Pew Forum on Religion & Public Life, 2009 June). However later

generations do not; second-generation (19%) and third-generation (12%) immigrants have much lower rates of affiliation with the Catholic church (Pew Forum on Religion & Public Life, 2009 June).

Interestingly, more than half (54%) of Latino Catholics identify themselves as charismatics. This points to what is commonly referred to as "renewalist Christianity", which is a movement that has achieved momentum recently and is three times more likely among Latino Protestants than their non-Latino counterparts (Pew Forum on Religion & Public life, June 9, 2009). Evangelical and Pentecostal churches are growing, as many Latino Catholics are converting to a more evangelical style of worship and/or Evangelical and Pentecostal churches. Some Latino Catholics claim that there is a lack of enthusiasm in Catholic mass services, however, the most prominent motive for the conversion is for a more direct, personal experience of God. Who are these Latinos? They are more likely to be second or later generation immigrants. Post-immigration, Latino immigrants are exposed to a new culture and faced with the decision of how to maintain or modify their cultural traditions. For many second or later generation Latinos, switching from Catholicism to more evangelical Christianity is not a difficult transition. For first generation Latinos who strongly identify with their cultural traditions, leaving the Catholic Church would have negative consequences, as their family and community would not easily accept and support such a decision to go against tradition (Hagerty, 2011). This is why religious identities tend to intensify after immigration for Latino immigrants, because Latinos tend to hold on more strongly to their cultural religious tradition as a way of maintaining their closeness to their culture (Aranda, 2008).

African Americans and religion. African Americans currently make up about 13.6% of total population in the U.S. (United States Census Bureau Census Briefs, 2011 September). Religion takes on a very influential and central role for African American culture. Because of the history of oppression African Americans experienced in the U.S., their historical and present religious experiences may be influenced by the social conditions of African Americans in a White-dominated society. Religion, especially during times of great oppression, may have served as a refuge, a way to bolster cultural identity and to strengthen resistance against that oppression. For example, the Civil Rights Movement was founded on the principles of justice and equality, and notably, it was a Christian-led movement. During this struggle, Black Liberation Theology was an aspect of this movement and faith in the Christian gospel helped further the struggle for civil rights and social justice (Cross, James, Toussaint, Markowitz, & Farrel, 2003). This gave the church a powerful role in social activism. Black churches had become known as the first line of defense against crises in black communities (Cross et al., 2003). Historically, the church was the center for social and spiritual support for African Americans particularly because it was one of the few spaces that was built, funded, and sustained by African Americans.

Even in more recent times, African Americans continue to value and maintain religiosity prominently in their culture. A great percentage of African Americans (79%) claim that religion is very important in their lives, compared to only 56% of the entire U.S. population (Pew Forum on Religion and Public life, 2009 January). Across a variety of religiosity dimensions, African Americans consistently prove to be more religious than the U.S. population as a whole. African Americans are the group most likely to report a

formal religious affiliation, with 87% of African Americans claiming to belong to one religious group or another (Pew Forum on Religion and Public life, 2009 January). Compared to 70% of the US population, 88% of African Americans believe in God or a higher power with absolute certainty (Pew Forum on Religion and Public life, 2009 January). Around 53% of African Americans attend religious services at least once a week, compared to only 39% of the US population (Pew Forum on Religion and Public life, 2009 January). African-Americans stand out as the most religiously committed ethnic group in the nation.

The majority of African Americans are Protestant (78%), which makes them the most Protestant racial and ethnic group in the U.S. (Pew Forum on Religion and Public life, 2009 January). More than 75% of African American Protestants (and 59% of African-Americans overall) belong to historically Black Protestant denominations (Pew Forum on Religion and Public life, 2009 January). Apart from the historical Black Protestant tradition, 15% of African Americans are evangelical Protestants (Pew Forum on Religion and Public life, 2009 January). Geography plays a role as well, as 64% of African Americans who reside in the South are members of historically Black churches (Pew Forum on Religion and Public life, 2009 January).

Gender differences in religiosity are especially pronounced among African Americans, with African American women much more religiously committed than African American men. About 84% of African American women claim that religion is very important to them and 59% attend religious services at least once a week (Pew Forum on Religion and Public Life, 2009, January). African American women (82%) are more likely than African-American men (72%) to identify as Protestant (Pew Forum on

Religion and Public Life, 2009, January). About 62% of African American women and about 55% of African American men are affiliated with historically Black Protestant churches (Pew Forum on Religion and Public Life, 2009, January). African American women stand out for their high level of religious commitment, making them somewhat like the backbone of the African American church.

Interestingly, religion has a rich, historical, and cultural influence on both Latino and African American culture. Because the role of religion is unique for these ethnic minorities, it is worthwhile to investigate how the influence of religion manifests itself in other aspects of life, such as overall health and well-being. Could there be aspects of religion that are more salient in health outcomes for certain ethnic groups than others? Ethnicity has a tremendous influence on an individual's health in various ways, which makes it plausible that there would be a unique relationship between religion and health for each ethnic group.

The relationship between health and ethnicity

Health and health equity. It is misleading and incomplete to define health as the absence of illness or disease, as if it were a single-dimensional construct. To be healthy is much more than simply being free of disease; as defined by the World Health Organization (Callahan, 1973), it is more encompassing, referring to overall and complete well-being (physically, mentally, and socially). From a human rights perspective, it is critical to acknowledge that every person has a right to be healthy and reach their highest attainable standard of health (Hunt, 2006). However, it is unfortunate that health is not always deemed a basic human right in our society. Denying certain

persons their value by denying certain rights and opportunities for health allows for unjust differences in health, which consequently brings about health inequity.

Braveman and Gruskin (2003) explain that a precise definition of health equity is necessary mainly to guide measurement and accountability. Equity is inevitably an ethical concept, which directly relates to justice and fairness. Inequity, hence, refers to differences that are unnecessary, unjust, and avoidable. Health equity denotes an absence of unjust difference in health between social groups who have different levels of underlying social advantage/disadvantage (Braveman & Gruskin, 2003). In other words, inequity systematically puts groups already disadvantaged at greater disadvantage, or puts those groups already privileged at greater advantage. Social advantage/disadvantage may be based on wealth, power, and/or prestige, and these attributes determine the social hierarchies that group individuals (Braveman & Gruskin, 2003). Examples of social groups with more or less disadvantage are socioeconomic groups, racial/ethnic groups, religious groups, age groups, gender groups, disability groups, etc. Bringing it all together, health inequity is systematically, consistently, and persistently associated with social disadvantage (Braveman & Gruskin, 2003). Health equity asserts that every person, regardless of social disadvantage/advantage, has the right and opportunity of attaining the highest standard of health. It includes every person having equal access to economic, educational, employment, and housing opportunities that contribute to a healthier life.

Health of ethnic minorities. Addressing the relationship between ethnicity and health in American society, ethnic minorities experience systematic, persistent social disadvantage compared to non-Latino Whites. This overarching social condition of ethnic

minorities has significant, specific consequences for health outcomes. An example of how this occurs is through residential segregation. Because of longstanding and persistent discrimination in housing policies and avoidance of integrated neighborhoods, ethnic minorities have often been forced into racially segregated neighborhoods which are associated with detrimental health outcomes (Acevedo-Garcia, Osypuk, McArdle, & Williams, 2008). African American and Latino children consistently live in more disadvantaged neighborhoods than even the worst-off White children. Whereas poor White children are still likely to live in high opportunity neighborhoods, minority children are more likely to live in double jeopardy (poverty & disadvantaged neighborhood) (Acevedo-Garcia et al., 2008).

There are a variety of factors that may contribute to increasing the disparities in health between non-Latino Whites and ethnic minorities (particularly African Americans and Latinos). These include a complex web of social influences, such as socioeconomic factors (education, employment, income), social environment (educational and economic opportunities, racial/ethnic discrimination, work conditions), and access to preventive health-care services (screening and vaccination).

Latino health in particular is compromised. Latinos are reported to be the ethnic group with the worst access to health care, with 12% of Latino children and 26% of Latino adults having no source of care (Brown et al., 2000). The percentage of Latinos that were uninsured (30.7%.) in 2010 was the highest among all ethnic groups, such as non-Latino Whites (11.7%), Blacks (20.8%), and Asians (18.1%) (US Census Bureau Current Population Report, 2011 September). Latinos disproportionately suffer from diabetes, as they experience greater disparities in risk factors for diabetes (Vega,

Rodriguez, & Gruskin, 2009). Rates for specific cancers (cervical, liver, and stomach) are greater among Latinos. Other health disparities for Latinos are liver disease, HIV infection, homicide, and work-related injuries (Vega et al., 2009). Adolescent birth rate for Latino adolescents is approximately five times the rate for Asian/Pacific Islander adolescents, three times the rate for non-Hispanic White adolescents, and somewhat higher than the rates for non-Hispanic African Americans (Center for Disease Control, 2011 January).

Non-Latino African Americans have the highest percentage of any ethnic group of householders living in inadequate, unhealthy housing, which can increase risk for injuries, elevate blood lead levels, and exacerbate other conditions, as well as contribute to cancers, cardiovascular disease, and asthma (Center for Disease Control, 2011 January). The infant mortality rate for non-Latino African American women was 1.5 to 3 times greater than for women of other ethnicities (Center for Disease Control, 2011 January). Similarly, one of every five infants born to African American mothers was born preterm, compared with one of every nine infants born to non-Latino white and Latina women (Center for Disease Control, 2011 January). Both African American men and women have high coronary heart disease death rates. African American women died at a higher rate (37.9%) than White women (19.4%) as a result of coronary heart disease and African American men also had a much higher rate (61.5%) compared with White men (41.5%) (Center for Disease Control, 2011 January). Among females, African American women have the highest rate of obesity (Center for Disease Control, 2011 January). The gap between African American men and non-Hispanic White men continues to widen for HIV infection (Center for Disease Control, 2011 January). Hypertension is more

prevalent for Africans Americans (42%) compared to non-Latino Whites (28.8%) (Center for Disease Control, 2011 January).

Paradoxes for ethnic minorities. For both African Americans and Latinos, perplexing paradoxes persist. The African American religion-marriage paradox is characterized by African Americans having the highest religiosity of any ethnicity in the nation, however, having very low levels of marriage, marital quality, and relationship stability (Wilcox & Wolfinger, 2007). Religiosity is associated with marriage quality and stability; however, interestingly, for African Americans, while religiosity is vibrant, the institution of marriage is fragile (Wilcox & Wolfinger, 2007). Needless to say, despite African Americans having high levels of religiosity, they still encounter various health disparities.

While there are many devastating health problems that disproportionately affect Latinos, the unusual phenomenon of the Latino paradox that makes Latinos very fortunate should not be overlooked. Especially for recent immigrants, Latinos enjoy decently good health. Previous studies have indicated Latinos experience relatively better health than other groups of comparable socioeconomic standing. Latinos are less likely to engage in risky health behaviors like smoking and drinking alcohol (Abraído-Lanz, Chao, & Florez, 2005). However, with more exposure to American culture and greater acculturation, that fortunate advantage diminishes and eventually becomes completely non-existent, as more acculturated Latinos are more likely to smoke, have high alcohol intake, and have high body mass index (BMI) levels (Abraído-Lanz, Chao, & Florez, 2005).

The paradoxes for Latinos and African Americans are intriguing. If religious commitment is supposedly producing such significant and promising outcomes, what is preventing those positive outcomes for ethnic minorities? How does it affect the health of minorities? What is the interplay of these three factors?

Role of religion in health among ethnic groups

In bringing together these three relationships of health and religiosity, ethnicity and religiosity, and ethnicity and health, certain questions arise. What is the role of ethnicity in the relationship between religiosity and health? What are the unique experiences of racial ethnic minorities that determine how religion impacts their health? What does the interplay look like?

One hypothesis is that religiosity is a powerful coping resource in times of hardship. There are several forms of helpful religious coping, such as spiritual support (e.g., emotional reassurance and guidance), practical social support, and benevolent religious reframing (e.g., attributing adverse events to God's will) (Pargament, 1997). One interesting possibility is that religion may be an even more powerful coping resource for certain groups of people. Groups that have been marginalized or are at a greater disadvantage tend to report higher religiosity and more frequent religious coping. Because they have a greater investment in their religion, they tend to gain more from it (Pargament, 1997). Ethnic minorities may gain greater benefits from their commitment to their religiosity because in general, ethnic minorities have limited opportunities to access other helpful resources. In contrast to many other resources, religion may be easily accessible (Pargament, 1997). For disadvantaged groups, social resources are especially precious highlighting the value of their religious social capital, which is the social

resource resulting from the social connections within a religious community (Maselko, Hughes, & Cheney, 2011).

There is abundant evidence that religious coping has unique effects for ethnic minorities and other disadvantaged minority groups. For African Americans, religion has been instrumental in providing practical support, as illustrated by the church being a powerful political force for social change, especially during the fight for civil rights (National Research Council, 2004). One study found that while Whites did not benefit much from religious coping, African Americans' higher religious coping was related to lower ambulatory blood pressure (Steffan, Hinderliter, Blumenthal, & Sherwood, 2001). For many urban communities, religious involvement is crucial in maintaining the traditional norms for nuclear family life. It has been especially protective in keeping African American men from the lure of the street life (Ellison, Burdett, & Wilcox, 2010). For Latinos, the machismo tradition among Latino men has been linked to greater domestic violence, infidelity, and alcohol abuse (Frias & Angel, 2005). Religion may protect Latino families from the effects of machismo. Latinos may benefit more from the social support and meaning/purpose provided by religious community (Ellison et al., 2010).

Other researchers have examined how differences in ethnicity play a role in the relationship between health outcomes and various dimensions of religiosity. Specifically looking at church-based social relationships and its relationship to health, the potential influence of ethnicity was explored (Krause, 2002). Because African Americans are culturally more oriented toward collective responsibility, there was reason to predict that they may report more cohesiveness in their church congregation and consequently

receive more church-based social support. Older African Americans who attended services more often were more likely to feel closer to God, be more optimistic, and generally be more involved in their religion than their older White counterparts (Krause, 2002). Therefore, older African Americans were more likely to reap health-related benefits than older Whites (Krause, 2002). African Americans may also have a great gain in life expectancy through religious attendance, as there is nearly a fourteen-year (difference) advantage in life expectancy at age 20 for those who attend more than once a week compared to African Americans who never attend (Hummer et al., 1999).

Using a nationwide survey to examine the relationship between religious-based beliefs about suffering and health, older Mexican Americans who used their faith to find something positive in their suffering tended to rate their health more favorably, as opposed to those who suffer in silence (Krause & Bastida, 2011). Historically, Mexican Americans have suffered much strife, from the consequences of colonization in the past to the continuing discrimination in the present, which has contributed to shaping religiously oriented views of suffering (Krause & Bastida, 2011). In order to cope with suffering, searching for positive outcomes in the face of adversity and suffering in silence are a couple of strategies used (Krause & Bastida, 2011). Older Mexican Americans who search for something positive in their torment report a perceived closer relationship with God; a closer relationship with God predicted greater optimism; and optimism predicted better health (Krause & Bastida, 2011).

In examining how the effects of depressive symptoms on cognitive function are moderated by church attendance, Reyes-Ortiz and colleagues (2008) found that frequent church attendance is beneficial for maintaining the cognitive functions of older Mexican

Americans. Church attendance lessened the impact of clinically relevant depressive symptoms on subsequent cognitive function (Reyes-Ortiz et al, 2008). For general psychological well-being, using the General Social Survey data, religiosity was a better predictor of psychological well-being for African Americans than for non-Hispanic Whites (St. George & McNamara, 1984). It is clear that religiosity, through many diverse mechanisms, may interact with ethnicity to influence various health outcomes.

Inspiration for current research

While there have been a few investigations on how ethnicity can interact with religiosity to influence health/well-being outcomes, there is one specific research study that directly investigated religiosity and health among three different ethnicities in a nationally representative sample. Drevenstedt (1998) attempted to address how the health benefits of religious behaviors, practices, beliefs, and attitudes differ among three ethnic minorities (Non-Latino Whites, African Americans, Latinos) using data from the General Social Survey (GSS). Correlational analyses between religiosity and health and regression analyses of religious attendance on subjective health were conducted. The regression analyses controlled for confounding variables such as gender, age, social support, socioeconomic status (SES), and subjective religiosity.

The time frame included in the analyses was between the years of 1974 and 1991 (1974-1977, 1980, 1982, 1984, 1987-1991). Those twelve years were selected to obtain a sizeable sample of Latinos and to optimize the frequency with which certain health and religion related questions were included in the GSS. The measures included variables such as subjective health, religious attendance, subjective religiosity, social support, demographic variables, education level, and household income. Because there is evidence

that religious attendance tends to increase with age, the sample was divided at the mean age of 39.7, which created two age groups, younger (18 – 39 years) and middle-aged (40 – 65 years).

Drevenstedt (1998) concluded that the healthy benefits of religious attendance are dependent on ethnicity, as well as gender and age. Attendance predicted self-rated health for Whites, but it did not have the same predictive power for Blacks and Latinos. Correlation analyses revealed that for White men and women in both age groups, greater religious attendance was related to better health. Regardless of age or gender, Blacks consistently reported worse health and higher religious attendance and subjective religiosity than their White counterparts. Even though there are positive effects of greater religious commitment among Blacks, their economic disadvantage seems to have a greater, negative impact on their health. Latinos tended to be in worse health than Whites, but slightly better than Blacks. Although Latino attendance was higher, subjective religiosity was lowest compared to Whites and Blacks. Religious attendance and health were positively related for young Latina women as for most other groups. Education and income were not related to religious variables for Latinos, which suggests that religiosity may not be dependent on socioeconomic status for Latinos.

Several hypotheses that attempt to explain the relationship between religious attendance and health were tested by controlling for certain confounding influences in the regression analyses. The *social support hypothesis* claims that the health benefits of religious attendance are driven by social support. Drevenstedt (1998) found evidence for this hypothesis for middle-aged Whites, in that controlling for social support reduced the partial correlation between religious attendance and health to non-significant levels for

middle-aged Whites. The *socioeconomic hypothesis* proposes that lower socioeconomic status diminishes the health benefits from religious attendance for Latinos and Blacks, or it acts as a suppressor. Therefore, once it was controlled for, the association between attendance and health was expected to be increased. Evidence for this hypothesis was found only for middle-aged Black men. Socioeconomic variables were important to consider for this group when examining the relationship between attendance and health, because once it was controlled for the health benefits of attendance became significant. The *subjective religiosity hypothesis* posits that the personal, intrinsic religious commitment is what links religious attendance to health. For young people with the exception of young White men, religious attendance was predictive of health if the young person held a strong commitment to their faith. Therefore, attendance was related to health, depending on the degree of commitment to faith.

Because Drevenstedt's (1998) study speaks directly to the question of what role ethnicity plays in the relationship between religiosity and health, it serves as the inspiration, guide, and model for the current research study. Similar investigations have not been conducted since and results have not been updated, although this investigation has gained recognition and has been cited by several others (Cummings & Jackson, 2008; Arredondo, Elder, Ayala, & Campbell, 2005; Hill, Burdett, Angel, & Angel, 2006; Hill, Angel, Ellison, & Angel, 2005; Levin, Chatters, & Taylor, 2005; Plante, Saucedo, & Rice, 2001; Tabak & Mickelson, 2009). Therefore it is our intent to build on this research study, strengthening it by addressing some of its weaknesses and updating it in light of more contemporary perspectives on religiosity and with more recent data.

For example, Drevenstedt (1998) decided to exclude non-religious persons from the analyses. In the measure chosen for subjective religiosity, only those who responded with some degree commitment to their faith were considered and those who were "not religious" were excluded from analyses. However, by excluding non-religious individuals, no longer can it be an investigation of the effect of religion on health. Instead, it becomes the effect of degree of religiosity on health. Because one of our main objectives is to investigate the influence of religiosity on health, in our analyses, non-religious individuals will not be excluded, especially since the non-religious population has increased since the 1990's. Drevenstedt (1998) also used a rather outdated measure of social support. Although it might have been a current conceptualization of social support when he carried out his investigation, social support was measured by how many memberships to social organizations an individual had. Since Drevenstedt's (1998) study, there has been much more research on the mechanism of social support in the impact of religiosity on health, therefore there is no need to test for the social support hypothesis with this investigation. Social support will not be analyzed in the current investigation. Finally, Drevenstedt (1998) was unable to achieve a large sample size for African Americans and Latinos. The current investigation will benefit from a larger sample size for both African Americans and Latinos because it will include all years the GSS has been conducted. In short, Drevenstedt's (1998) investigation is an exemplary study to build upon; with recent data and recent perspectives on religiosity, the current investigation will enhance and strengthen this particular research approach to studying the relationship between religiosity and ethnicity on health.

Objectives and predictions

The objectives of the research project are the following:

1. Address how the relationship between religiosity and health differs for different racial/ethnic groups. Attempt to replicate previous research and provide an update.
2. Address what the interplay between religion, health, and ethnicity is. Augment previous research by analyzing what the interactions between these three components are and interpret implications.
3. Address the question of how the ever-diversifying face of America, with ethnic minority populations increasing at such a rapid rate, is changing the relationship between religiosity and health over time. Analyze how these relationships between health, religiosity, and ethnicity have changed and what differentiates current times from the past.

Particular hypotheses are the following:

1. The correlations reported by Drevenstedt will generally be replicated in the current study. In particular, it is expected that subjective health will be positively associated with religious attendance, subjective religiosity, income, and education, both overall and in the ethnicity subgroups. Some of these bivariate relationships were non-significant in Drevenstedt's study for African Americans, likely because of the small sample sizes in those gender and age subgroups.
2. Predicting religious attendance: It is expected that, true to past trends, ethnic minorities will demonstrate higher levels of religious attendance than non-Latino Whites. It is expected that religious attendance will be higher in the older era and

lower in recent, modern times, indicating that religious attendance has declined. However, for minorities it is expected that the decline of religious attendance will not be as steep.

3. Predicting health: It is expected that minorities will be in poorer health than non-Latino Whites. Further expected is a decline in health for all ethnic groups, but a steeper decline for ethnic minorities. It is expected that in general, those with greater religious attendance will also experience better health.
4. Interactions between ethnicity and measures of religiosity are anticipated, such that the relationship between religiosity and health will be different for each ethnic group. Different rationales would lead to different expectations regarding the form of the interactions. On the one hand, there is evidence that more disadvantaged groups gain greater benefits from their religious commitment, which would suggest that the relationship between religiosity and health may be stronger for the minority groups than for non-Latino Whites. On the other hand, there is evidence that the relationship between religiosity and health may be less positive for Latinos than for either African Americans or non-Latino Whites. Thus, specific, explicit prediction regarding the form of the interaction will not be made. The relationship between health and religiosity will be examined for two dimensions of religiosity: religious attendance, and subjective religiosity.

Method

Dataset

The data analyzed were from the General Social Survey (GSS), which is a sociological survey that has been conducted nation-wide since 1972. It was conducted every year from 1972 to 1994 (except 1979, 1981, & 1992) and has been conducted every other year since 1994. The purpose of the GSS is to monitor social change and the growing complexity of American society (General Social Survey website). It has been used to gather information on a wide variety of topics concerning the attitudes and characteristics of a diverse sample within the U.S. It is the largest project funded by the Sociology Program of the National Science Foundation (General Social Survey website). This dataset has been widely used and has proven to be useful in social science research. Apart from the U.S. Census, the GSS is possibly the most frequently analyzed dataset in the social sciences (General Social Survey website).

Controlling for confounding variables

There is always a context in which religion impacts health, which is why covariates and confounding variables within that context matter greatly. This is the motivation behind the necessity of statistical control for these confounding variables. There are several methods commonly used for implementing statistical control (Miller & Thoresen, 2003). One method is the block design, in which subjects are sorted into groups called blocks (Maxwell & Delaney, 2004). Usually, these blocks are based on certain characteristics, such as age, gender, or ethnicity. Separating individuals systematically by certain characteristics creates a more homogenous group, and since

they all share the same characteristic, it can be more certain that the effects on the dependent variable are not due to confounding factors.

In examining the relationship between religiosity and health among different ethnicities, it is crucial to acknowledge the possible confounding influences on health and religiosity. Following Drevenstedt's research, for this research project, controlling for age, gender, and socioeconomic status was a priority.

Age. Older individuals tend to be more religious, but also individuals who are highly religious tend to become even more religious as they age. While highly religious older persons tend to report an increase in their religiosity as they age, those low in religiosity tend to report a decrease (Hunsberger, 1985). For the high religiosity and low religiosity groups, before the age of 20 there was a relatively small difference in religiosity, but by old age that difference had become substantial (Hunsberger, 1985). Therefore, age is not completely independent of religiosity and its confounding influence will be controlled for by conducting separate analyses for each of the two age groups, younger (18-39) and middle-aged (40-65). To reduce the possibility that religious attendance is a marker of greater health and mobility, which is most plausible in an elderly population, we followed Drevenstedt's (1998) method of excluding individuals over 65 years of age.

Gender. Gender can also be linked to religiosity, as there is substantial evidence that there is a clear gender difference in religiosity tendencies. It is nothing new to characterize women as being more religious than men. However, looking beyond the superficial demographic characteristic of gender, simply having a feminine outlook predicts religiosity (Thompson, 1991). While there is the social constructionist

perspective in explaining gender differences in religiosity, there is also a physiological and evolutionary perspective (Miller & Hoffmann, 1995; Stark, 2002). In any case, gender differences are undeniable, which makes it important to control for gender in our analyses.

Income and education. Since there is a striking social gradient in health, as increasing levels of income are consistently associated with increasing levels of health, it is important to take this into account (Marmot, 2005). Education is also a powerful determinant of health, and also demonstrates a steep gradient (Robert Wood Johnson Foundation, 2009). With greater wealth and education, there are more opportunities for improved health and minimized exposure to harmful effects ranging from environmental hazards to everyday, stressful minor disturbances, all of which contribute to better health outcomes. Therefore, these two powerful social determinants of health will be controlled by adding them as continuous covariates in the major analyses.

Religious preference. Finally, because there are many formal religious traditions, each unique in its practices and beliefs, religious preference makes a difference. Also there seems to be a tendency for certain ethnic groups to commit to a particular religious denomination driven by culture. For example, Latinos are heavily Catholic while African Americans are more likely to belong to a historically Black Protestant church. Although religious preference may also influence health outcomes, it will not be explicitly reported the current study, though secondary analyses of this variable will be alluded to.

Variables selected

From the immense GSS dataset, the analyses will include all the years the GSS was conducted from 1972 to 2010. The variables included in the analyses are essentially

the same variables Drevenstedt (1998) included in his analyses. A unique contribution of this investigation is to explore and compare more recent times to the past years. The first, older era is meant to replicate the time frame used in Drevenstedt's (1998) analyses, which is from 1972 to 1991. The more current era would include data from the years 1992 to 2010. It is important to note that not all the variables chosen to assess will be available every year.

Demographic variables. Age, as previously mentioned, was dichotomized into two groups, younger (18 - 39 years) and older (40 – 65 years). Participant's sex was recorded as either male or female. As a measure of income, "Inflation adjusted family income" was used just as it is. Finally, education was measured with the variable "Highest year of school completed."

Race/ethnicity was developed and created in a particular fashion. The foundation variable was "Race," which was categorized into "White, Black, or other." Whites and Blacks were captured with this base variable; however Latinos were not easily identified. The GSS recently introduced the "Hispanic specified" variable in 2000, which makes it possible to capture the Latino population more accurately and acknowledge different subgroups of Latinos. However, prior to this variable in circulation, there was an issue with identifying Latinos. In his methodological report, Smith (2001) assesses the effectiveness of designating all those who identify a Spanish-speaking country as their origin as Hispanic. While there are some Hispanics that were excluded, an overwhelming majority (86%-96%) of people mentioning "Mexico, Puerto Rico, Spain, and Other Spanish-speaking country" identified as Hispanic (Smith, 2001). Thus, for the years prior to 2000, Latinos could be captured by utilizing this strategy. With the variable "Ethnic"

(available for every year since 1972), Latinos could be identified their family's country of origin as, "México, Puerto Rico, Spain, and Other Spanish." After 2000, the "Hispanic specified" variable could be used to identify Latinos, since it is a direct measure of Latino identity. Taken all together, a final race variable called "Race4" was generated, which utilizes all three of the previously mentioned variables. As a final variable, it includes four racial/ethnic categories, "non-Latino White," "non-Latino Black," Latino," and "other," with only the first three categories being included in the current investigation.

Health and religiosity. Other main variables include health and religiosity. Health was measured with the variable that asked respondents to provide a subjective "Condition of health," which describes how an individual self-rates his or her health in general on a four-point scale from "Poor" to "Excellent". This is the same variable that Drevenstedt (1998) used. Religiosity was captured with two main variables. Religious attendance was measured by how often an individual attends religious services, which included nine levels, ranging from "Never" to "More than once a week." To capture a more personal, internal perspective on religiosity, as a measure of subjective religiosity, "Strength of affiliation" was included, which describes how strongly committed an individual is his or her religious tradition, ranging from 2 = "Not very strong" to 4 ="Strong." Individuals claiming no religious affiliation were assigned a value of 1 on this subjective religiosity scale.

Sample characteristics

Exploring the characteristics of this sample as a whole, it consists of 45,974 observations in total, but sample sizes on primary continuous variables ranged from 34,367 to 45,877 observations. Including all ethnic groups combined, household income

ranged from $402 to $180,386 and the average household income was $47,206.26. The education of the entire sample ranged from no years to 20 years of education, with an average of 13.04 years. Most of the sample consisted of Non-Latino Whites (78.4%), then non-Latino Blacks (14.5%), then Latinos (7.1%). While the relative sizes of the subpopulations of non-Latino Whites and Blacks have remained consistent between time eras, the percentage of Latinos has changed greatly across time eras. In the previous era Latinos comprised only about 4% of the entire sample, but in the current era the percentage of Latinos increased to about 10% of the entire sample. In the American population, the Latino population has grown quite a bit over the last decade, and the proportion of Latinos in this sample, across time eras, reflected that growth. The entire sample, across time eras, is relatively evenly distributed with respect to gender and age categories, as 45.1% of the entire sample are male and 51.5% of the sample belong to the younger age group.

For non-Latino Whites only, the average income is $50,698 and the average education level is 13.27 years. The average age of the non-Latino White population is about 40.65 years old, 49.4% belong to the younger age group, and 46.4% are male. For non-Latino Blacks alone, the average income is $31,988 and the average education level is 12.25 years. The average age of the non-Latino Black population is about 39.05 years old, 54.6% belong to the younger age group, and 38.6% are male. For Latinos exclusively, the average income is $36,938 and the average education level is 11.68 years. The average age for the Latino population is about 36.15 years old, and 64.8% belong to the younger age group, and 43.2% are male.

Results

The analyses conducted target each of the hypotheses and predictions made and will be reported in the following order. First, simple means of the main variables of religiosity and health will be reported to provide a brief snapshot into these variables. Later analyses will delve into specific tests of differences. The second set of analyses compares correlations between the previous era and the current time to explore how relationships have changed across time. The third and fourth sets of analyses test the differences in means of religious attendance and health, respectively, as a function of the main discrete factors. The final set of analyses tests whether the relationship between religiosity and health varies by ethnicity.

Descriptive statistics

To offer an initial introduction to the data, the following tables display the means and sample sizes for health, religious attendance, and subjective religiosity as a function of the four main discrete factors (ethnicity, gender, age group, and time era). As mentioned, the changing demographics of the nation are evident in the how the proportion of Latinos in this sample has increased over time from about 4% to 10%. In terms of the mean values for religious attendance, on average, individuals attended religious services somewhere between several times a year to once a month (see Table 1). Some of the most obvious trends are the higher attendance of ethnic minorities and women, especially ethnic minority women who on average attend once of week or more. Another point to highlight is that there is an decline in attendance over time. In terms of the means for health, not surprisingly, health seems to decline with age and is worse for ethnic minorities than for non-Latino Whites (see Table 2). The direction of changes in

health over time, however, varies across subgroups. In terms of the mean values for subjective religiosity, middle-aged adults and women have the highest subjective religiosity (see Table 3). A notable decline in subjective religiosity has occurred over time, although it appears that non-Latino Blacks may be an exception to this rule. The detailed analyses of these mean differences in health and religious attendance will be carried out after consideration of the correlational relationships.

Table 1. Religious attendance means based on era, ethnicity, gender, and age group

		Previous Era					Current Era			
		Younger	N	Middle Age	N		Younger	N	Middle Age	N
Non-Latino White	Men	3.23	4623	3.73	3875	Men	2.86	3390	3.20	4247
	Women	3.81	5309	4.47	4668	Women	3.36	3879	3.84	4796
Non-Latino Black	Men	3.44	696	4.06	579	Men	3.53	589	4.18	616
	Women	4.45	1152	5.36	782	Women	4.27	1080	5.12	938
Latino	Men	3.63	271	4.22	147	Men	3.19	601	3.55	343
	Women	4.10	427	5.23	163	Women	3.74	748	4.40	455

Table 2. Health means based on era, ethnicity, gender, and age group

		Previous Era					Current Era			
		Younger	N	Middle Age	N		Younger	N	Middle Age	N
Non-Latino White	Men	3.32	3511	2.97	2999	Men	3.24	2578	3.04	3162
	Women	3.24	3960	2.95	3575	Women	3.22	2862	3.05	3546
Non-Latino Black	Men	3.21	562	2.73	470	Men	3.14	445	2.77	446
	Women	3.04	907	2.51	634	Women	3.07	819	2.74	691
Latino	Men	3.21	204	3.02	117	Men	3.11	440	2.79	252
	Women	3.05	321	2.79	126	Women	2.97	533	2.72	337

Table 3. Subjective religiosity means based on era, ethnicity, gender, and age group

		Previous Era					Current Era			
		Younger	N	Middle Age	N		Younger	N	Middle Age	N
Non-Latino White	Men	2.46	3965	2.68	3266	Men	2.33	3308	2.55	4134
	Women	2.70	4618	3.01	3992	Women	2.54	3790	2.84	4679
Non-Latino Black	Men	2.69	583	2.85	466	Men	2.65	575	2.93	599
	Women	2.87	1030	3.37	676	Women	2.87	1053	3.26	924
Latino	Men	2.56	238	2.70	125	Men	2.39	593	2.64	340
	Women	2.68	386	2.94	146	Women	2.57	737	2.77	455

Correlational comparisons of change over time

The first set of analyses focuses primarily on examining whether Drevenstedt's (1998) findings regarding the relationships among religiosity, health, and socioeconomic variables in the period of 1970's to 1990's have remained at the same level, have declined, or have strengthened over time. Correlational analyses among the variables of health, religious attendance, subjective religiosity, income, and education are displayed for the entire sample, separately for each era (see Table 4). Although nearly all correlations are highly significant given the large sample sizes, correlations across the three domains of health, religiosity and socioeconomic factors are relatively weak, but seem to be increasing over time.

Table 4. Correlations among health, religiosity, and socioeconomic variables for each era

	Health	**Attendance**	**Religiosity**	**Income**	**Education**
Health	---	0.045**	0.018*	0.217**	0.287**
Attendance	0.072**	---	0.643**	0.033**	0.024**
Religiosity	0.029**	0.640**	---	0.002	-0.018*
Income	0.227**	0.063**	0.021**	---	0.346**
Education	0.258**	0.081**	0.027**	0.372**	---

Note: Correlations above the diagonal are from the previous era of 1972-1991, correlations below the diagonal are from the recent era of 1992-2010. All correlations are based on at least 14,000 participants.
*p<0.05, **p<0.01, ***p<0.001

To determine whether and how these relationships have changed over time, correlations were compared between the previous era and the current era and tested to determine if these correlations were statistically significantly different from each other. Specifically, correlations were transformed using Fishers *r* to *z* transformation and then compared via two-sample *z* tests. A measure of the size of the effect was also computed

for each correlation comparison, where small, medium, and large effect sizes could be defined using *q* values of 0.1, 0.3, and 0.5, respectively. Such tests were carried out for the entire sample (see Table 5) and separately for each ethnic group (see Table 6).

Taking all ethnic groups together, there has been significant change across eras. In fact, as shown in Table 5, tests of change were significant or highly significant for 6 of the 10 bivariate relationships examined. The relationship between religious attendance and health has strengthened over time, increasing from r=0.045** to r=0.072** (z=2.50, q=0.03, p=0.012). In contrast, the relationship between education and health has weakened over time, decreasing from r=0.287** to r=0.258** (z=-2.90, q=-0.03, p=0.004); education appears to be losing its influential benefit on health over time. The relationships between socioeconomic variables and religiosity are also strengthening over time; income and education are becoming better predictors of attendance over time. Income is now more strongly related to attendance, with the correlation increasing from r=0.033** to r=0.063** (z=3.07, q=0.03, p=0.002). Education is also now more strongly related to attendance, with the correlation increasing from r=0.024** to r=0.081** (z=6.10, q=0.06, p<0.001), and the increase in the strength of this latter relationship is the largest and most significant change across time. The relationships between socioeconomic variables and subjective religiosity have become more positive over time; in the previous era, income and education were either unrelated to, or negatively related to, subjective religiosity. Income has become a positive predictor of subjective religiosity, whereas it was previously unrelated, with the correlation increasing, albeit non-significantly, from r=0.002 to r=0.063** (z=1.86, q=0.02, p=0.064). Education has also become a positive predictor of subjective religiosity, whereas it was previously

negatively associated, with the correlation changing from r=-0.018* to r=0.027** (z=4.59, q=0.05, p<0.001).

Table 5. Tests of differences in correlations across eras for entire sample

Relationship		**Previous Era *r***	**Previous Era N**	**Current Era *r***	**Current Era N**	***q* (effect size)**	***z* test**	***p* value**
Health	Attendance	0.045**	17520	0.072**	16549	0.03	2.50	0.012
	Religiosity	0.018*	14487	0.029**	16105	0.01	0.96	0.337
	Income	0.217**	16418	0.227**	15068	0.01	0.93	0.351
	Education	0.287**	17586	0.258**	16715	-0.03	-2.90	0.004
Attendance	Religiosity	0.643**	19736	0.640**	21840	-0.01	-0.52	0.604
	Income	0.033**	21450	0.063**	20279	0.03	3.07	0.002
	Education	0.024**	22980	0.081**	22500	0.06	6.10	<0.001
Religiosity	Income	0.002	18478	0.021**	19816	0.02	1.86	0.063
	Education	-0.018*	19771	0.027**	21959	0.05	4.59	<0.001
Income	Education	0.346**	21521	0.372**	20471	0.03	3.06	0.002

Note: *p<0.05, **p<0.01, ***p<0.001

Table 6. Test of differences in correlations across eras by ethnicity

Ethnic Group	Relationship		Previous Era *r*	Previous N	Current Era *r*	Current N	*q* effect size	*Z* test	*p* value
non-Latino White	Health	Attendance	0.068**	13963	0.099**	12010	0.03	2.51	0.012
		Religiosity	0.032**	11473	0.039**	11676	0.01	0.53	0.594
		Income	0.202**	13144	0.223**	11028	0.02	1.7	0.089
		Education	0.281**	14020	0.262**	12129	-0.02	-1.65	0.098
	Religious Attendance	Religiosity	0.657**	15794	0.658**	15804	0	0.16	0.876
		Income	0.063**	17287	0.098**	14803	0.04	3.15	0.002
		Education	0.052**	18451	0.123**	16289	0.07	6.66	<0.001
	Subjective Religiosity	Income	0.028**	14855	0.044**	14463	0.02	1.37	0.17
		Education	-0.004	15823	0.041**	15889	0.05	4.01	<0.001
	Income	Education	0.319**	17346	0.346**	14940	0.03	2.72	0.006
non-Latino Black	Health	Attendance	-0.018	2559	0.050*	2360	0.07	2.38	0.017
		Religiosity	-0.01	2133	0.04	2300	0.05	1.66	0.096
		Income	0.206**	2329	0.193**	2300	-0.01	-0.46	0.645
		Education	0.289**	2565	0.208**	2392	-0.09	-3.04	0.002
	Religious Attendance	Religiosity	0.569**	2747	0.550**	3121	-0.03	-1.06	0.291
		Income	-0.004	2915	0.120**	3121	0.12	4.83	<0.001
		Education	0.018	3201	0.132**	3212	0.11	4.59	<0.001
	Subjective Religiosity	Income	-0.017	2496	0.032	2300	0.05	1.69	0.09
		Education	-0.012	2748	0.078**	3140	0.09	3.45	<0.001
	Income	Education	0.336**	2924	0.418**	2852	0.1	3.63	<0.001
Latino	Health	Attendance	0.021	766	0.032	1548	0.01	0.25	0.803
		Religiosity	0.043	660	0.042	1532	0	-0.02	0.983
		Income	0.199**	723	0.200**	1391	0	0.02	0.982
		Education	0.229**	767	0.208**	1560	-0.02	-0.5	0.618
	Religious Attendance	Religiosity	0.564**	893	0.560**	2114	-0.01	-0.15	0.884
		Income	-0.035	951	0.026	1913	0.06	1.54	0.125
		Education	-0.068*	1006	-0.026	2144	0.04	1.1	0.271
	Subjective Religiosity	Income	-0.054	846	0.034	1894	0.09	2.13	0.034
		Education	-0.031	893	0.004	2123	0.04	0.88	0.381
	Income	Education	0.379**	951	0.332**	1926	-0.05	-1.36	0.175

Note: *p<0.05, **p<0.01, ***p<0.001

Now, attention is turned toward the examination of these correlational relationships separately for each ethnic group (see Table 6), beginning with non-Latino Whites. Most of the relationships for non-Latino Whites have become stronger over time, as was the case for the sample as a whole. The relationship between health and religious attendance has increased from r=0.068** to r=0.099** (z=2.51, q=0.03, p=0.012). In more recent times, greater religious attendance is more strongly related to better health. However, the relationship between health and subjective religiosity has not changed significantly across eras (z=0.53, q=0.01, p=0.594), as was the case also for the entire sample. The relationship between health and income has strengthened somewhat, but non-significantly, for Whites over time, from r=0.202** to r=0.223** (z=1.7, q=0.02, p=0.089), which is consistent with the lack of significant change for the entire sample. The relationship between health and education has decreased non-significantly over time, from r=.281** to r=0.262** (z=-1.65, q=-0.002, p=0.098). The relationships between religious attendance and socioeconomic variables have strengthened over time. Income is currently more strongly related to attendance, increasing from r=0.063** to r=0.098**, (z=3.15, q=0.04, p=0.002). Education is also now more strongly related to attendance, increasing from r=0.052** to r=0.123** (z=6.66, q=0.07, p<0.001), and this is largest and most significant change in strength of relationship for any pair of variables for non-Latino Whites. This shows that in the current era, greater religious attendance has become more strongly related to higher income and higher education. Additionally, subjective religiosity has become more strongly related to at least one socioeconomic variable; it is significantly more strongly related to education, with the correlation increasing from r=-0.004 to r=0.041** (z=4.01, q=0.05, p<0.001. Finally, the

relationship between education and income has strengthened over time, from r=0.319** to r=0.346** (z=2.72, q=0.03, p=0.006), as better education is now more strongly related to higher income. In summary, the greatest changes across eras (largest effect size) have been the relationship between religious attendance and education and between subjective religiosity and education.

For non-Latino Blacks, there has also been significant change over time in most relationships and most of the change over time resembles that for non-Latino Whites. The relationship between attendance and health has strengthened over time, as in the previous time era, religious attendance was slightly negatively associated with health (r=-0.018), and in the current time era attendance has become more strongly, positively related to health (r=0.050**), z=2.38, q=0.07, p=0.017. The relationship between subjective religiosity and health has tended to become stronger, though the change was non-significant (z=1.66, q=0.05, p=0.096); a negative association was present in the previous era (r = -.010), but currently, there is a positive association (r = .040). As was the case for non-Latino Whites, the relationship between health and education has weakened, from r=0.289** to r=0.208** (z=-3.04, q=0.09, p=0.002). In the current era, greater education is no longer as strongly related to better health. The relationships between religious attendance and socioeconomic variables have greatly strengthened since the previous time era. Attendance was not significantly related to either income (r=-0.004) or education (r=0.018) in the previous era, but in the current era attendance has become strongly related to greater income (r=0.120**, z=4.83, q=0.12, p<0.001) and greater education (r=0.132**, z=4.59, q=0.11, p<0.001). These two increases in strength of relationship are the largest, most significant changes across time for non-Latino Blacks

and two of the greatest, most significant changes for any ethnic group. Once more, while there were slight negative relationships between subjective religiosity and education (r=-0.012) in the previous era, subjective religiosity has become more strongly, positively related to education(r=0.078**, z=3.45, q=0.09, p<0.001) in the current time era. Finally, the relationship between income and education has strengthened significantly, from r=0.336** to r=0.418**, z=3.63, q=0.10, p<0.001; greater education is more strongly related to better income in the current time era. In summary, the relationships with the most significant change across time eras has been the curious pattern of a slight negative relationship between religiosity and socioeconomic variables in the previous era changing to stronger, positive associations between greater religiosity and better socioeconomic status.

For Latinos, unlike non-Latino Whites and Blacks, there has not been much significant change over time in the relationships being examined. The sole significant change across time has been in the relationship between subjective religiosity and income. Whereas an apparent negative association was present in the previous era, r=-0.054, income has become positively related to attendance in the current era, r=0.043, z=2.13, q=0.09, p=0.034. In the previous era, greater subjective religiosity was slightly related to lower income, however, in the current era, greater subjective religiosity has become related to higher income, although it is not a significant relationship. There has been other change over time for Latinos, although not significant change, and the direction of change has generally followed the patterns of change of the other ethnic groups. As was true for non-Latino Whites and Blacks, the relationship between religious attendance and health has strengthened, but the relationship between subjective

religiosity and health has remained consistent over time. Once again, like non-Latino Whites and Blacks, Latinos also have stronger relationships between religiosity (attendance and subjective religiosity) and socioeconomic variables in the current era, although the increase of the strength of these relationships has been generally less than that seen for Blacks. Further, similarly to non-Latino Blacks, for Latinos there was a slight negative association between subjective religiosity and socioeconomic variables in the previous era, which became a positive association in the current era. Unique for Latinos has been the weakened relationship between education and income in the current era, while the other ethnic groups have experienced a strengthening of this relationship in the current era. Income has a similar relationship to health in both time eras, but education is tending to be less strongly related to health in the current era. The size of this decline in the relationship between education and health is similar to non-Latinos Whites' decline in this relationship, which suggests that Latinos are losing the benefit of education on their health in the same way Whites have.

In final summary, for all ethnic groups, health has become more strongly related to religious attendance over time and socioeconomic variables have also become more strongly related to religiosity. Education's influence on health has also changed over time for all ethnic groups, as there has been a weakening of this relationship across time and it appears that education no longer provides as much benefit for health as it used to. Although education remains a strong predictor of income across ethnic groups, it has the strongest positive impact for non-Latino Blacks. In other words, education has not only become a stronger predictor of income over time, the greatest increase has been for non-Latino Blacks. Latinos have not experienced much change across time; however, the

relationship between subjective religiosity and income has strengthened over time for Latinos. More broadly for non-Latino Blacks and Latinos, the strengthened relationships between religiosity and socio-economic variables have been the greatest change of any change over time. A consistent pattern across all ethnic groups is that education and income have become stronger predictors of religiosity; socioeconomic variables have become more strongly and positively related to religious attendance and subjective religiosity in the current era. Particularly interesting and encouraging is that income has remained a stronger predictor of health and in particular, it is not a more important resource for health for a certain ethnic group. The relationship between health and income has strengthened slightly (non-significantly) for non-Latinos Whites and for ethnic minorities this relationship between income and health remains consistent across time. However, ignoring for the moment the mean differences in income overall, the impact that income has on health as a social determinant of health does not give more advantage to non-Latino Whites over ethnic minorities, as the strength of this relationship has essentially remained the same across time for all ethnic groups.

Analyses of covariance on attendance

Following analyses to determine how the relationships between health and religiosity have changed as a function of time, analyses to evaluate how the average level of attendance has changed as a function of various factors were conducted. One-Way Analyses of Covariance (ANCOVAs) were conducted with religious attendance as the dependent variable and ethnicity, age, gender, and time as discrete predictor variables, and income and education as continuous covariates.

The analyses showed that the main effects of ethnicity, age, gender, and time era were all highly statistically significant (see Table 7). Partial eta squared is reported as a measure of effect size. The marginal means of attendance for each of these factors are displayed in Table 8 alongside mean attendance scores adjusted for group differences in means on the covariates of income and education. In addition, all six two-way interactions were statistically significant. Higher order interactions were also tested for; however they were non-significant and are not reported.

Table 7. Results from ANCOVA analyses on attendance

Source	**Mean Square**	**Degrees of Freedom**	***F***	***p* value**	η_p^2
Ethnicity	2082.627	2	313.058	<0.001	0.0152
Age group	1463.610	1	220.008	<0.001	0.0054
Gender	2216.479	1	333.178	<0.001	0.0081
Era	795.687	1	119.607	<0.001	0.0029
Ethnicity * Age	76.536	2	11.505	<0.001	0.0006
Ethnicity * Gender	88.190	2	13.257	<0.001	0.0007
Ethnicity * Era	126.883	2	19.073	<0.001	0.0009
Age * Gender	61.426	1	9.233	0.002	0.0002
Age * Era	91.696	1	13.784	<0.001	0.0003
Gender * Era	29.568	1	4.445	0.035	0.0001
Error	6.653	40613	---	---	--

Table 8. Mean attendance based on main factors

		Unadjusted Attendance Means	Adjusted Attendance Means	Education Means (years)	Income Means (dollars)
Ethnicity	Non-Latino White	3.563	3.521	13.296	$50,982.60
	Non-Latino Black	4.303	4.435	12.157	$33,104.86
	Latino	4.005	4.168	11.272	$36,981.24
Age	Younger	3.634	3.707	12.726	$37,040.14
	Middle-age	4.280	4.376	11.758	$43,672.33
Gender	Male	3.589	3.707	12.262	$43,659.71
	Female	4.345	4.450	12.221	$37,052.76
Era	Previous	4.145	4.288	11.616	$37,361.23
	Current	3.769	3.795	12.868	$43,351.24

Note: Adjusted means are computed for the following grand means of the covariates: Income=$47,085 & Education=13.05 years

For the main effect of ethnicity on attendance, follow-up post-hoc comparison tests were conducted to clarify how average attendance varies across ethnic groups (see Table 9). The average attendance of non-Latino Whites is significantly lower than the average attendance of non-Latino Blacks, $F(1, 40613)=555.12$, $p<0.001$; and significantly lower than the average level of attendance of Latinos, $F(1, 40613)=125.42$, $p<0.001$. For the ethnic minorities, non-Latino Blacks have significantly higher average attendance than Latinos, $F(1, 40613)=16.47$, $p<0.001$. The average attendance of non-Latino Blacks is significantly higher than the average attendance of the other ethnic groups (non-Latino Whites and Latinos combined, $F(1, 40613)=168.21$, $p<0.001$.

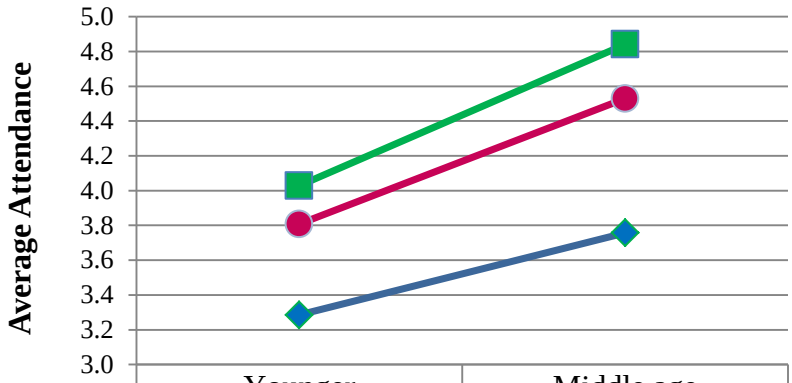
Table 9. Comparisons of average attendance

Comparison	***F***	***p* value**	η_p^2
Non-Latino Whites vs. Non-Latino Blacks	555.12	<0.001	0.0135
Non-Latino Whites vs. Latinos	125.42	<0.001	0.0031
Non-Latino Blacks vs. Latinos	16.47	<0.001	0.0004
Non-Latino Whites vs. others	452.56	<0.001	0.0110
Non-Latino Blacks vs. others	168.21	<0.001	0.0041
Latinos vs. others	10.53	0.001	0.0003

Note: All F-tests have (1, 40613) degrees of freedom
Bonferroni correction: critical *p* value = 0.0083

Now, considering each of the two-way interactions, the ethnicity by age group interaction was statistically significant, $F(2, 40613)=11.505$, $p<0.001$. Although the average level of attendance is greater for middle-aged adults overall, the difference in attendance between the two age groups significantly varies by ethnic group (see Figure 1). Post hoc comparison tests were conducted to clarify this interaction (see Table 10). Because of the multiple tests conducted, the Bonferroni correction revised the critical alpha significance value to $p=0.025$. The difference in attendance between age groups is significantly different for ethnic minorities than it is for non-Latino Whites, $F(1, 40613)=16.89$, $p<0.001$; the increase in attendance from the younger age group to the middle-age group is significantly greater for ethnic minorities. The difference in attendance between age groups is not significantly different for non-Latino Blacks than it is for Latinos, $F(1, 40613)=0.49$, $p=0.483$; comparing ethnic minorities to each other, the increase in attendance across age groups is practically identical. Overall, non-Latino Whites not only have the lowest average attendance, the difference between age groups is not as great as it is for non-Latino Blacks and Latinos. For the difference in attendance

between age groups, Non-Latino Whites are significantly different from the other ethnic groups, while ethnic minorities are similar to each other.

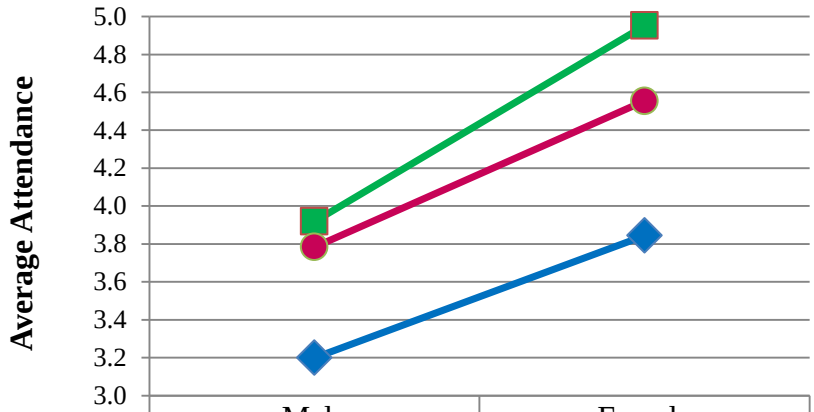


	Younger	Middle age
non-Latino White	3.285	3.757
non-Latino Black	4.028	4.841
Latino	3.808	4.529

Figure 1. Ethnicity by age group interaction on attendance

The ethnicity by gender interaction was statistically significant, $F(2, 40613)=13.257$, $p<0.001$. Although the average level of attendance is greater for women than men in all ethnic groups, the difference in attendance between men and women significantly varies by ethnicity (see Figure 2). Because four post-hoc comparison tests were conducted to clarify this interaction, the Bonferroni correction revised the critical alpha significance value to $p=0.0125$ (see Table 10). The difference in attendance between men and women is significantly different for non-Latino Blacks than it is for the other two ethnic groups, $F(1, 40613)=12.98$, $p<0.001$; attendance for non-Latino Black women is higher than that of any ethnic-gender group. The difference in attendance between men and women is not significantly different for non-Latino Whites than it is for Latinos, $F(1, 40613)=1.22$, $p=0.269$; the increase in attendance for women is similar for Latinos and non-Latino Whites. The difference in attendance between genders is not

significantly different for non-Latino Blacks than it is for Latinos, $F(1, 40613)=4.05$, $p=0.044$; for ethnic minorities, the increase in attendance for women is similar, despite that Black women have the greatest average attendance. Overall, non-Latino Blacks have the greatest average attendance and the increase in attendance for Black women over Black men is the most dramatic, while Latinos resemble non-Latino Whites in the increase in attendance for women. Put differently, in terms of the difference in attendance between genders, Non-Latino Blacks are significantly different from the other ethnic groups, while non-Latino Whites and Latinos are similar to each other.

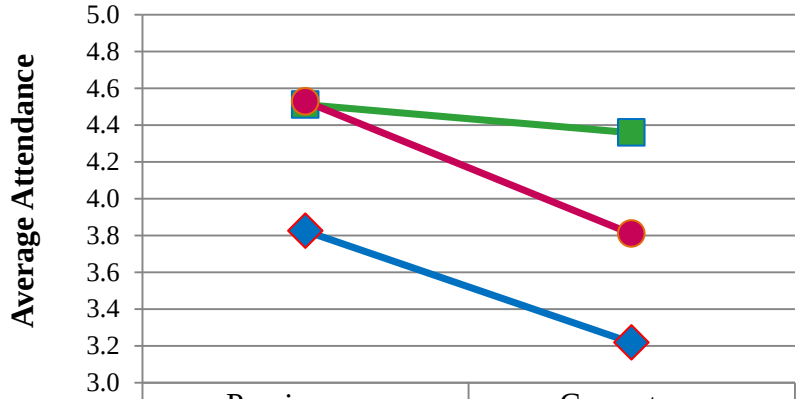


	Male	Female
non-Latino White	3.199	3.844
non-Latino Black	3.918	4.952
Latino	3.783	4.554

Figure 2 Ethnicity by gender interaction on attendance

The ethnicity by era interaction was statistically significantly, $F(2, 40613) = 19.073$, $p < 0.001$. Although the average level of attendance was higher in the previous era, the difference in attendance between eras significantly varies by ethnicity (see Figure 3). Using a Bonferroni correction with unequal alpha levels, one prior post-hoc interaction contrast was tested at $\alpha=0.025$ and three post-hoc interaction contrasts were tested at $\alpha=0.0083$ (see Table 10). The difference in attendance between eras is

significantly different for non-Latino Blacks than it is for the other ethnic groups combined, $F(1, 40613)=31.83$, $p< 0.001$; the decrease in attendance for the current time era is the least drastic for non-Latino Blacks. The difference in attendance between eras is not significantly different for non-Latino Whites than it is for Latinos, $F(1, 40613)=0.97$, $p=0.324$; the decrease in attendance in the current era is similar for Latinos and non-Latino Whites. Comparing ethnic minorities to one another, the difference in attendance between time eras is significantly different for non-Latino Blacks than it is for Latinos $F(1, 40613)=18.80$, $p<0.001$; the decrease in attendance for Latinos is much more drastic than for non-Latino Blacks. The difference in attendance between eras for non-Latino Whites is significantly greater than it is for ethnic minorities combined, $F(1, 40613)=5.72$, $p=0.017$. Because it had been previously hypothesized that non-Latino Whites' decrease in attendance would be more drastic than it is for ethnic minorities, this test had critical $\alpha=0.025$; the decrease in attendance in the current time era is, as predicted, significantly greater for non-Latino Whites than for ethnic minorities combined. Overall, non-Latino Blacks have remained relatively consistent in their attendance across time eras, while the other ethnic groups have much lower average attendance in the current era. Non-Latino Whites had a substantial decrease in attendance in the current era, but they are not completely different from ethnic minorities as Latinos have experienced a similar decrease in their attendance.



	Previous era	Current era
non-Latino White	3.825	3.218
non-Latino Black	4.511	4.359
Latino	4.528	3.809

Figure 3. Ethnicity by era interaction on attendance

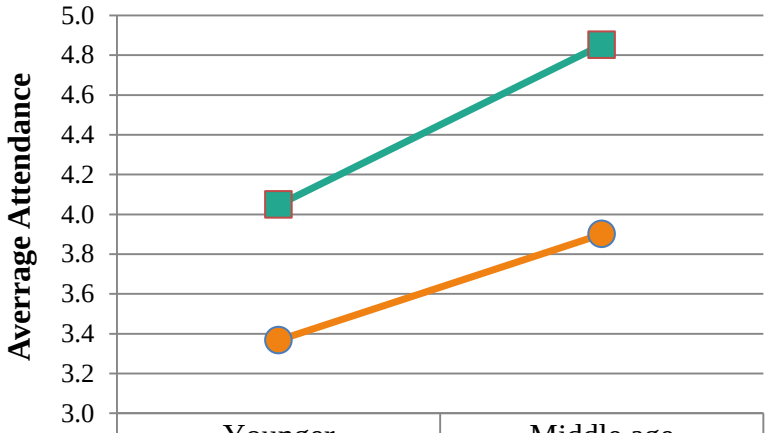
Table 10. Comparisons of differences in attendance by interaction

Interaction	**Comparison of Differences in Attendance**	***F***	***p* value**	η_p^2
Ethnicity * Age	Non-Latino Whites vs. Others	16.89	<0.001 [A]	0.0004
	Non-Latino Blacks vs. Latinos	0.49	0.483 [A]	<0.0001
Ethnicity * Gender	Non-Latino Blacks vs. Others	12.98	<0.001 [B]	0.0003
	Non-Latino Whites vs. Latinos	1.22	0.269 [B]	<0.0001
	Non-Latino Blacks vs. Latinos	4.05	0.044 [B]	<0.0001
	Non-Latino Whites vs. Others	12.97	<0.001 [B]	0.0003
Ethnicity * Era	Non-Latino Blacks vs. Others	31.83	<0.001 [C]	0.0008
	Non-Latino Whites vs. Latinos	0.97	0.324 [C]	<0.0001
	Non-Latino Blacks vs. Latinos	18.8	<0.001 [C]	0.0005
	Non-Latino Whites vs. Others	5.72	0 017 [A]	0.0001

Note: All *F* tests have (1, 40613) degrees of freedom
Bonferroni correction critical p values: A = 0.025, B = 0.0125, C = 0.0083

The gender by age group interaction was significant, $F(1, 40613)=9.233$, $p=0.002$; the difference in attendance between age groups significantly depends on gender (see

Figure 4). Middle-age adults have greater average attendance than younger adults. Women also have a greater average attendance than men, however there is a greater difference in attendance between men and women among the middle-aged group than there is in the younger group.



	Younger	Middle age
Men	3.367	3.9
Women	4.048	4.852

Figure 4. Gender by age group interaction on attendance

The age group by era interaction was significant, $F(1, 40613)=13.784$, $p<0.001$; the difference in attendance between eras significantly depends on age group (see Figure 5). In the current time era, attendance is much lower than it was in the previous era. In the previous era, there was a much greater difference in attendance between the younger and the middle-aged groups, but in the current era, the difference in attendance has lessened.

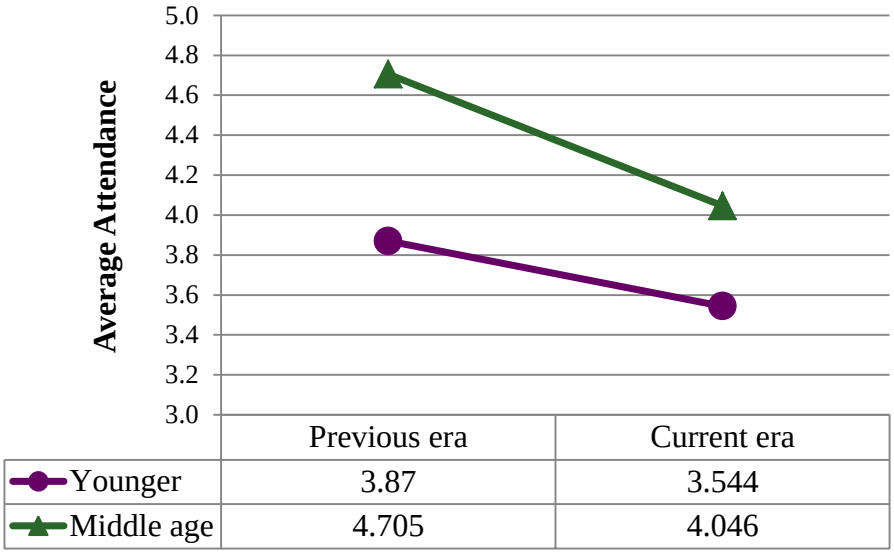


Figure 5. Age group by era interaction on attendance

The gender by era interaction was significant, $F(1, 40613) = 4.445$, $p=0.035$; the difference in attendance between eras significantly depends on gender (see Figure 6). Average attendance is much lower in the current era and women have greater attendance than men, however the difference between men and women is slightly smaller in the current era than it was in the previous era.

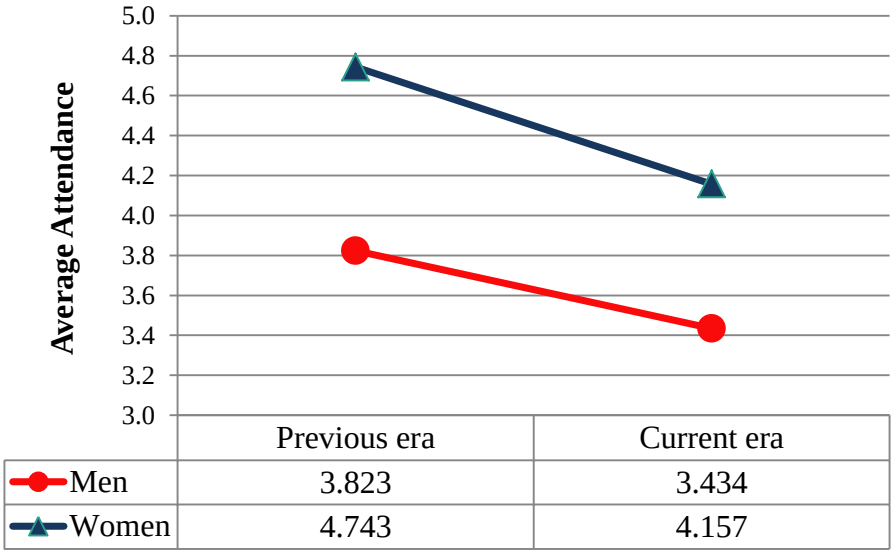


Figure 6. Gender by era interaction on attendance

Analyses of covariance on health

Following analyses of how the average level of attendance has changed as a function of four factors of ethnicity, age, gender, and time era, analyses were conducted to assess how the average level of health has changed as a function of these factors. One-Way between-group Analyses of Covariance (ANCOVAs) were conducted with subjective health as the dependent variable and ethnicity, age, gender, and time as discrete predictor variables, and income and education as continuous covariates.

As was the case of attendance, the analyses showed that the main effects of ethnicity, age, gender, and era on health were all highly significant (see Table 11). Four of the six two-way interactions were statistically significant. Of the higher order interactions, one three-way interaction of ethnicity by gender by era was statistically significant. The mean subjective health scores based on each of these factors are contrasted against the mean health scores unadjusted for income and education, and the average level of education and income are also shown in Table 12. As shown, younger Americans are healthier than their older counterparts, men report higher levels of subjective health than women, and adjusting for income and education, health is worse in the recent era than in the previous era. In comparing average health with and without considering education and income, it is clear that these socioeconomic variables make a difference. Especially comparing average health across ethnic groups, controlling for the effect of socioeconomic variables on health, the average health of ethnic minorities comes closer to the average health of non-Latino Whites. That is to say that if ethnic minorities were comparable to non-Latino Whites in socioeconomic status, their health would also be more comparable. However, the gap in health between ethnic minorities,

particularly non-Latino Blacks, and non-Latino Whites would persist, because socioeconomic variables are not the sole influences on health.

Table 11. Results from ANCOVA analyses on health

Source	**Mean Square**	**Degrees of Freedom**	***F***	***p* value**	η_p^2
Ethnicity	15.843	2	27.765	<0.001	0.0018
Age group	183.805	1	322.122	<0.001	0.0104
Gender	16.378	1	28.703	<0.001	0.0009
Era	30.871	1	54.102	<0.001	0.0018
Ethnicity * Age	7.555	2	13.241	<0.001	0.0009
Ethnicity * Gender	8.203	2	14.376	<0.001	0.0009
Ethnicity * Era	4.599	2	8.060	<0.001	0.0001
Age * Gender	0.260	1	0.455	0.500	<0.0001
Age * Era	0.019	1	0.033	0.857	<0.0001
Gender * Era	4.622	1	8.101	0.004	0.0003
Ethnicity * Age * Era	1.814	2	3.179	0.042	0.0002
Error	0.571	30655			

Table 12. Mean health scores based on main factors

		Unadjusted Health Means	Adjusted Health Means	Education Means (years)	Income means (dollars)
Ethnicity	Non-Latino White	3.13	3.102	13.296	$50,982.60
	Non-Latino Black	2.91	3.006	12.157	$33,104.86
	Latino	2.96	3.098	11.272	$36,981.24
Age	Younger	3.21	3.205	12.726	$37,040.14
	Middle-age	2.95	2.933	11.758	$43,672.33
Gender	Male	3.12	3.109	12.262	$43,659.71
	Female	3.06	3.029	12.221	$37,052.76
Era	Previous	3.09	3.125	11.616	$37,361.23
	Current	3.08	3.013	12.868	$43,351.24

Note: Adjusted means are computed for the following grand means of the covariates: Income=$46,842 & Education=13 years

To follow up on the main effect of ethnicity, post-hoc comparison tests were conducted to clarify how average health varies by ethnicity (see Table 13). The average health of non-Latino Whites is significantly better than the average health of non-Latino Blacks $F(1, 40613)=55.08$, $p<0.001$. Adjusting for education and income, however, the average health of non-Latino Whites is not significantly different than the average health of Latinos, $F(1, 40613)=0.06$, $p=0.814$. For the ethnic minorities, non-Latino Blacks have significantly worse average health than Latinos $F(1, 40613)=17.30$, $p<0.001$. The average health of non-Latino Blacks is significantly worse than the average health of non-Latino Whites and Latinos combined $F(1, 40613)=38.02$, $p<0.001$.

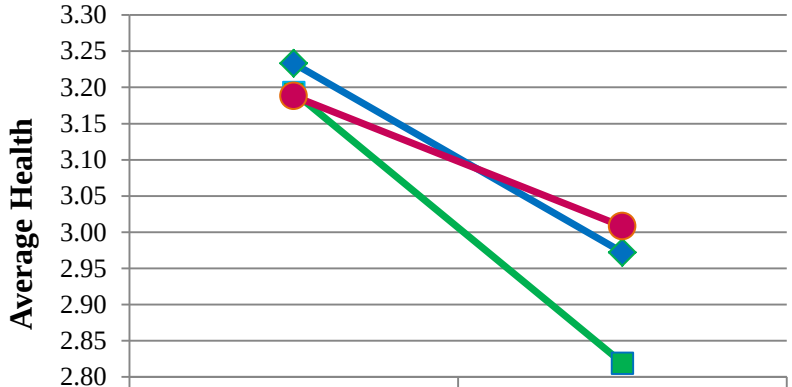
Table 13. Comparisons of average health

Comparison	F	p value	η_p^2
Non-Latino Whites vs. Non-Latino Blacks	55.08	<0.001	0.0018
Non-Latino Whites vs. Latinos	0.06	0.814	<0.0001
Non-Latino Blacks vs. Latinos	17.30	<0.001	0.0006
Non-Latino Whites vs. others	16.70	<0.001	0.0005
Non-Latino Blacks vs. others	38.02	<0.001	0.0012
Latinos vs. others	4.86	0.028	0.0002

Note: All F-tests have (1, 40613) degrees of freedom
Bonferroni correction: critical *p* value = 0.0083

Now, turning attention over to each interaction, the ethnicity by age interaction was significant, $F(2, 30655)=13.241$, $p<0.001$. Although the younger age group has better average better health, the difference in health between age groups significantly varies by ethnicity. Post hoc interaction contrast tests were conducted to clarify this interaction (see Table 14). Because four post-hoc interaction contrasts tests were conducted, the Bonferroni correction revised the critical alpha significance value to $p=0.0125$. The difference in health between age groups is significantly different for non-Latino Blacks than it is for non-Latino Whites and Latinos together, $F(1, 40613)=25.81$, $p<0.001$; the decrease in health as a function of age is much greater for non-Latino Blacks. The difference in health between age groups is not significantly different for non-Latino Whites than it is for Latinos, $F(1, 40613)=4.41$, $p=0.036$; despite non-Latino Whites' decrease in health with age is slightly greater than Latinos, the decrease is similar for both. The difference in health between age groups is significantly different for non-Latino Blacks than it is for Latinos, $F(1, 40613)=19.60$, $p<0.001$; although they may have similar average health in the younger age group, middle-aged Blacks experience a

greater decrease in health with increasing age. Overall, the non-Latino Blacks' decrease in health with age is much more drastic than for any other ethnic group, while the decreases in average health for Latinos and for non-Latino Whites are similar to each other.

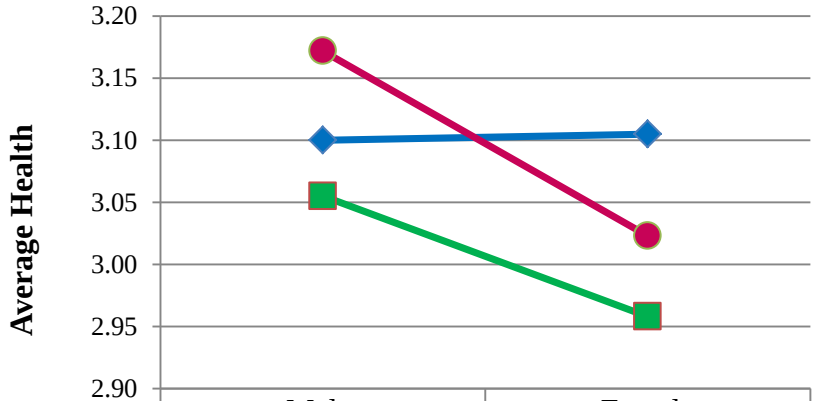


	Younger	Middle age
non-Latino White	3.233	2.972
non-Latino Black	3.193	2.819
Latino	3.188	3.008

Figure 7. Ethnicity by age group interaction on health

The ethnicity by gender interaction was significant $F(2, 30655)=14.376$, $p<0.001$. Although men generally report having better average health than women, the difference in health between genders significantly varies by ethnicity (see Figure 8). Because six post-hoc interaction contrast tests were conducted to clarify this interaction, the Bonferroni correction revised the critical alpha significance value to $p=0.0083$ (see Table 14). The difference in health between genders is significantly different for non-Latino Whites than it is for ethnic minorities, $F(1, 30655)=27.88$, $p<0.001$; non-Latino White women actually experience a slight increase in average health, while ethnic minority women experience a decrease in average health. Comparing ethnic minorities to each other, the difference in health between genders is not significantly different for non-

Latino Blacks than it is for Latinos, $F(1, 30655)=1.44$, $p=0.230$; the decrease in health for minority women is similar for both ethnic minority groups. The difference in health between genders is significantly different for non-Latino Whites than it is for non-Latino Blacks, $F(1, 30655)=15.62$, $p<0.001$; while average health for non-Latino Whites does not change much, it drastically decreases for non-Latino Blacks. Similarly, the difference in health between genders is significantly different for non-Latino Whites compared to Latinos, $F(1, 30655)=15.97$, $p<0.001$. Overall, non-Latino Whites are unique, as the difference in health between genders is very little, compared to ethnic minority women who experience a decrease in health compared to ethnic minority men.

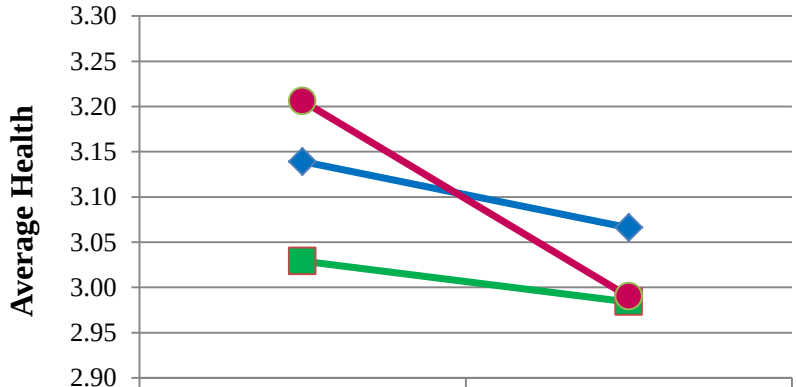


	Male	Female
non-Latino White	3.1	3.105
non-Latino Black	3.055	2.958
Latino	3.172	3.023

Figure 8. Ethnicity by gender interaction on health

The ethnicity by time era interaction was significant, $F(2, 30655)=8.060$, $p<0.001$. Although average health was better in the previous time era, the difference in health between eras significantly varies by ethnicity (See Figure 9). Because four post-hoc comparison tests were conducted to clarify this interaction, the Bonferroni correction revised the critical alpha significance value to $p=0.0125$ (see Table 14). The difference in

health between eras is significantly different for Latinos than it is for the other ethnic groups together, $F(1, 30655)=16.08$, $p<0.001$; the decrease in health in the current era for Latinos is significantly much more drastic for Latinos than for the other ethnic groups. The difference in health between eras is not significantly different for non-Latino Whites than it is for non-Latino Blacks, $F(1, 30655)=1.24$, $p=0.266$; although non-Latino Whites have better health than non-Latino Blacks in general, the decrease in health in the current era is similar for these two ethnic groups. Since it was hypothesized that non-Latino Whites would decline in health differently than ethnic minorities, comparing non-Latino Whites to ethnic minorities indicated that the difference in health between eras is not significantly different, $F(1, 30655)=5.69$, $p=0.017$. Overall, the current era has a decreased average health than the previous era, but it is especially true for Latinos, who experienced the most drastic decrease in health. It was hypothesized that Whites would not decrease in health in the current era as drastically as ethnic minorities would, which is partially supported with Latinos' greater decrease in health.



	Previous	Current
non-Latino White	3.139	3.066
non-Latino Black	3.029	2.984
Latino	3.206	2.99

Figure 9. Ethnicity by era interaction on health

Table 14. Comparisons of differences in health by interaction

Interaction	Comparison of Differences in Attendance	F	*p* value	η_p^2
Ethnicity * Age	Non-Latino Blacks vs. Others	25.81	<0.001[A]	0.0008
	Non-Latino Whites vs. Latinos	4.41	0.036[A]	0.0001
	Non-Latino Blacks vs. Latinos	19.60	<0.001[A]	0.0006
	Non-Latino Whites vs. Others	0.47	0.492[A]	<0.0001
Ethnicity * Gender	Non-Latino Blacks vs. Others	0.62	0.429[B]	<0.0001
	Non-Latino Whites vs. Latinos	15.97	<0.001[B]	0.0005
	Non-Latino Blacks vs. Latinos	1.44	0.230[B]	<0.0001
	Non-Latino Whites vs. Others	27.88	<0.001[B]	0.0009
	Non-Latino Whites vs. non-Latino Blacks	15.62	<0.001[B]	0.0005
	Latinos vs. Others	6.90	0.009[B]	0.0002
Ethnicity * Time era	Latinos vs. Others	16.08	<0.001[A]	0.0005
	Non-Latino Whites vs. non-Latino Blacks	1.24	0.266[A]	<0.0001
	Non-Latino Whites vs. Others	5.69	0.017[A]	0.0002
	Non-Latino Blacks vs. Latinos	15.24	<0.001[A]	0.0005
Time era * Ethnicity * Age group	Latinos vs. Others	5.87	0.018[C]	0.00028
	Non-Latino Whites vs. non-Latino Blacks	0.002	0.896[C]	<0.0001

Note: All test have (1, 30655) degrees of freedom
Bonferroni correction critical p values: A = 0.0125, B = 0.0083, C = 0.025

The gender by era interaction was significant, $F(1, 30655)=8.101$, $p=0.004$; the difference in health between eras significantly depends on gender (see Figure 10). Average health is much lower in the current era and men have better health than women, however the difference in health between men and women is significantly smaller in the current era than it was in the previous era.

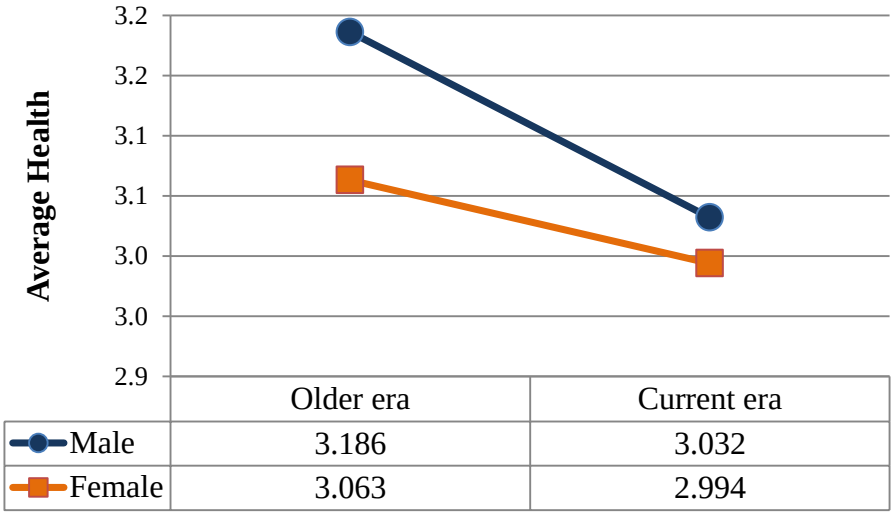
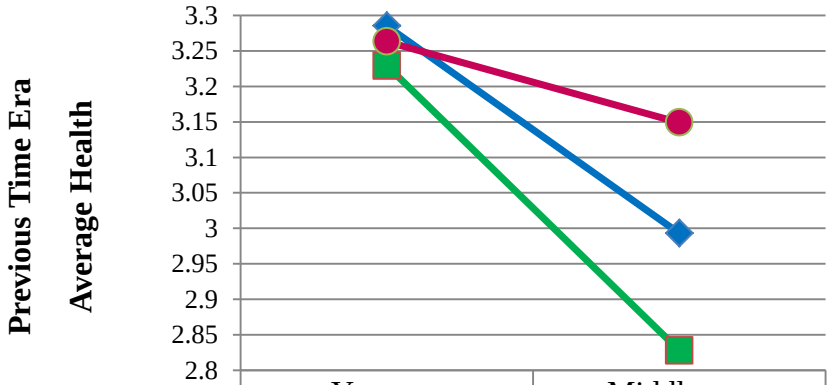


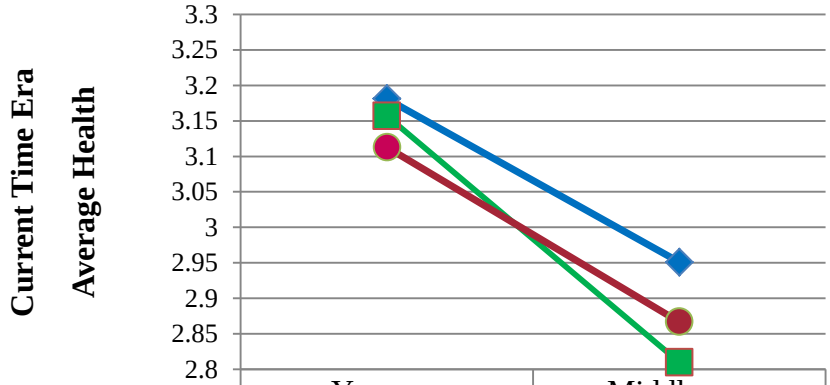
Figure 10. Gender by era interaction on health

The interaction of ethnicity by age group by era was statistically significant, $F(2, 30655)=3.179$, $p=0.042$**.** Although there is a general decrease in health from the younger age group to the middle-age group for all three ethnic groups, this decrease varies across ethnic groups and the form of the simple two-way interactions of ethnicity by age varies significantly by era (see Figure 11). How health decreases between age groups for each ethnicity is significantly different in the previous era compared to the current era and post-hoc comparisons were conducted to clarify this interaction. Because multiple tests were conducted, a Bonferroni correction revised the critical alpha significance value to $p=0.025$ (see Table 14). Comparing non-Latino Whites to non-Latino Blacks, the form of the decrease in health (between age groups) across eras is not significantly different, $F(1, 30655)=0.002$, $p=0.896$. The difference in health between non-Latino Whites and Blacks is greater in the middle-age group than for the younger age group, however, it is similar in both eras. Comparing Latinos to the other two ethnic groups, the form of the decrease in health across time is significantly different, $F(1, 30655)=5.87$, $p=0.018$. For Latinos,

the decrease in health as a function of age is much greater in the current time era than it was in the previous time era. Specifically for Latinos in the current era, as they have experienced the most drastic decrease in health between eras, they have become more like the other ethnic groups. In the previous era, Latinos appeared to do best and not experience much of a decrease in health in middle-age, but compared to the current era, Latinos decrease in health approaches the decrease that the other ethnic groups experience. Overall, although there is a general decrease in health for the middle-age adults compared to younger adults, the decrease between eras has been consistent for non-Latino Whites and Blacks, but moststriking, Latinos' decrease in health is much greater than it used to be.



	Younger	Middle age
non-Latino White	3.285	2.993
non-Latino Black	3.229	2.828
Latino	3.263	3.149



	Younger	Middle age
non-Latino White	3.181	2.951
non-Latino Black	3.157	2.81
Latino	3.113	2.867

Figure 11. Ethnicity by age group by era interaction on health

Analyses of covariance testing whether religiosity and health varies by ethnicity

In this final set of analyses, the purpose was to test whether the impact of religiosity on health would vary across ethnic groups. This set of analyses is similar to the previous set of analyses in which a One-Way Analysis of Covariance (ANCOVA) was conducted with subjective health as the dependent variable and ethnicity, age, gender, and time as discrete predictor variables, and in this case, income, education, and now also

religious attendance as continuous covariates. Another One-Way Analysis of Covariance (ANCOVA) was conducted identical to the one just mentioned with subjective religiosity as an additional continuous covariate in place of religious attendance. The main effect of attendance indicates that health significantly increases with attendance. The partial correlation between attendance and health, controlling for education and income, was somewhat larger for non-Latino Whites (0.061**) and for Latinos (0.046*) than for non-Latino Blacks (-0.005), suggesting some variation in the strength of the relationship across ethnic groups. However, the test of the interaction between ethnicity and attendance indicated that there is not a significant difference in the relationship between health and attendance levels across the three ethnic groups, $F(2, 30432)=0.607$, $p=0.545$. Because this interaction did not approach significance, it indicates that the relationship between attendance and health is not significantly different among the three ethnic groups. In other words, the influence that attendance has on health is not significantly different. For non-Latino Whites and Latinos, greater attendance may indicate more favorable health and be unrelated for non-Latino Blacks, but it is not more or less strong for a certain ethnic group.

The main effect of subjective religiosity indicates that average health is significantly and positively related to subjective religiosity, or health increases with subjective religiosity, as it did for attendance. In this case, the partial correlation between subjective religiosity and health, controlling for income and education, was strongest for Latinos (.048*), next strongest and Whites (.031**), and again weakest for Blacks (.017). However, the test of the interaction between ethnicity and subjective religiosity again indicated that there is not a significant difference in the relationship between health and

subjective religiosity across the three ethnic groups, $F(2, 30432)=0.772$, $p=0.462$. Because this interaction did not approach significance it indicates that there is essentially no evidence that the relationship between subjective religiosity and health is different among the three ethnic groups. In other words, how subjective religiosity influences health is not significantly different for non-Latino Whites than it is for non-Latino Blacks or for Latinos. For all three ethnic groups, greater subjective religiosity may indicate more favorable health, but it is not more or less strong for a certain ethnic group.

Discussion

The purpose of this investigation on religiosity, health, and ethnicity was to explore more in depth the interplay of these relationships among these three main variables: religiosity, health, and ethnicity/race. These relationships are indeed complex, as health is inextricably tied in with ethnicity, not to ignore the powerful role that ethnicity has on religiosity, and religiosity's impact on health. For example, religiosity is positively related to health, and ethnic minorities are more religious than non-Latino Whites but are still less healthy. Objectives were to verify what has been the change over time in these relationships among health, religiosity, and socio-demographic characteristics, and the potential for these relationships to be unique across ethnicity.

The specific aims of this investigation were to explore broadly how these variables interacted with one another. One goal was to depict what the relationships between religiosity, health, and ethnicity look like, then assess whether and/or how they have changed across time, and finally, directly compare these relationships among the three ethnic groups to verify how they may differ.

Change in correlations across time

A previous investigation initiated this exploration into what the relationships among religiosity, health, and ethnicity were like (Drevenstedt, 1998). It was proposed that a modified replication of this previous investigation would be carried out. Taken a step further, the relationships among these main variables would be compared across time. The previous era is the time frame in which Drevenstedt (1998) carried out his analyses and the current era includes what has occurred and changed since Drevenstedt's investigation. It was expected that ethnic minorities would hold stronger commitments to

religiosity than their non-Latino White peers, but experience poorer health in general than non-Latino Whites. It was also predicted that ethnic minorities would decline in their health across time more drastically than non-Latino Whites, but that their religiosity would not decline as drastically as non-Latino Whites decline in religiosity.

In fact there has been significant change across time in the relationships among health, religiosity, and socio-demographic variables, comparing the previous era to the current era. There are similar and unique patterns of change over time among these relationships across the three ethnic groups.

Change across time for Non-Latino Whites. For non-Latino Whites, there has been quite a bit of change across time, specifically, in the relationships between health and religiosity and between religiosity and socio-economic factors. Religious attendance has become more strongly related to health over time; in the current time era, attending religious services more frequently and having higher income are now even more predictive of better subjective health than they were in the previous era. Socioeconomic factors of income and education have also become more strongly related to religiosity; in the current era, higher income and more education are stronger predictors of more frequent attendance of religious services and how strongly non-Latino Whites feel committed to their religion. Specifically with education, it has become significantly more strongly related to religious attendance and subjective religiosity and these increases in the strength of these relationship were the greatest change over time for non-Latino Whites. However, there has been one relationship that has weakened, albeit non-significantly, over time; from the previous time era to the current era, education has become a weaker predictor of subjective health, with this being true in all ethnic groups.

Overall, the change across time in relationships among health, religiosity and socioeconomic variables has served to make these relationships more solid, stable, and reliable, with the exception of the relationship between education and health which has, if anything, become less stable and reliable. There is an interesting role that education plays for Whites, as it lost some of its relevance and importance for subjective health but has become more prominent and important for religious attendance. Also using the GSS data, in an investigation into the impact of education on religiosity, Schwadel (2011) explains that education positively affects religious participation, devotional activities, and emphasizing the importance of religion in daily life. Schwadel (2011) concludes that highly educated individuals are more likely to believe in a higher power, but it is a different story with strictly adhering to specific beliefs and viewpoints. It may be the case that non-Latino Whites who attain greater education may be more religious in the sense of attending religious services more frequently; however, they may be more hesitant to accept specific doctrines and views.

Change across time for Non-Latino Blacks. For non-Latino Blacks, some of the significant changes across time follow the pattern of non-Latino Whites, however, there has also been significant change over time that is unique for non-Latino Blacks. First, recall that Drevenstedt (1998) had found somewhat weaker relationships between religious attendance and health among Blacks than Whites. Similarly, in the current study, the bivariate correlation between attendance and health for Blacks was slightly negative (-.018) in the 1972-1992 era as opposed to positive and significant (.068) for Whites. Perhaps it should be noted here that correlations between religion and health are lowered somewhat by the fact that religious attendance increases with age while health

declines. Thus, the partial correlation for Blacks in the previous era between attendance and health controlling for age is actually positive and significant, $r = .045$, $p = .024$. Second, in terms of the change over time, non-Latino Blacks mirror non-Latino Whites in that the frequency of attending religious services has become a stronger predictor of health and in that socioeconomic factors have become stronger predictors of religiosity. For non-Latino Blacks, the increase in the strength of the bivariate relationship between health and attendance is even more of an increase than it was for non-Latino Whites (the effect size of the change for non-Latino Blacks was twice as great as for non-Latino Whites), which suggests that non-Latino Blacks have experienced more of a benefit in in their health with greater religious attendance than non-Latino Whites have. However, the fourth set of analyses detailed in the Results indicated that, once one controlled for income and education, the relationship between attendance and health was no stronger for Blacks than for Whites. Unique for non-Latinos Blacks is not only that socioeconomic factors have become stronger predictors of religious attendance, but that the increase in the strength of these relationships between income and education, on the one hand, and religious attendance, on the other, is the greatest increase (largest effect size) of all the examined changes over time. In the current era, the frequency of religious attendance of non-Latino Blacks is now much more strongly related to their income and education. Although income has a powerful influence on health, the predictive influence that income has on health for non-Latino Blacks has not changed over time. Even to a greater extent than was the case for non-Latinos Whites, education has lost some of its predictive influence on health in the current time era (the effect size of this decline was the largest negative value of any observed in the current study). This implies that education is losing

its beneficial influence on health more quickly for non-Latino Blacks than it is for non-Latino Whites.

It is intriguing how income and education have come to matter so much more for religious attendance, but income's influence on health has not changed over time and the benefit of education on health has weakened. The roles of socioeconomic factors are quite prominent among non-Latino Blacks. In American society, race/ethnicity has become intimately interwoven with socioeconomic status; therefore health outcomes for ethnic minorities are inevitably shaped by social and economic forces, more so than for non-minorities (House & Williams, 2000). Unfortunately, it is social and economic disadvantage that has become intimately interwoven with racial/ethnic minority status. While the hope would be to begin to see change over time, that income and education would become more strongly, positively related to health for ethnic minorities, this has not been the case. The powerful impact that low means levels on socioeconomic variables have on maintaining the disadvantaged status of ethnic minorities seems to persist across time.

Change across time for Latinos. For Latinos there has not been much significant change over time, however, some of the change that has occurred over time resembles the changes that the other two ethnic groups have experienced. The only significant change over time has been that income has become a stronger predictor of how strongly Latinos feel about their religious choices. In the current time era, although they are not yet significantly related to each other, income is now more relevant for subjective religiosity compared to the previous time era. Following the patterns of non-Latino Whites and Blacks, Latinos have also experienced a strengthened relationship between religious

attendance and health in the current time era; however this is not a significant change over time. In the same way, Latinos mirror the other two ethnic groups by also experiencing strengthened relationships among socioeconomic factors and religiosity measures, yet these changes over time are not significant. As it was for non-Latino Blacks, the predictive influence of income on health has not changed across time. The influence of education on health has weakened for all three ethnic groups, but this decline was significant only for Blacks. Also unique for Latinos has been that the influence of education on income has decreased over time; while the other ethnic groups have experienced an increase in the strength of the relationship between income and education, Latinos have not. It is peculiar that Latinos have not experienced much change across time, yet unique only for Latinos has been that income has become a stronger predictor of subjective religiosity. Over time, especially in the current era, Latinos have been leaving behind their traditional religious roots in the Catholic Church and choosing Protestant religions or choosing no religious affiliation. Further investigation into this finding reveals that in the current era, Latino Protestants have higher income than Latino Catholics, and Protestants have a greater average subjective religiosity compared to Catholics. Perhaps this shift in denominational affiliation is responsible in part for the stronger relationship between income and subjective religiosity among Latinos.

From the comparisons of the changes across time in the relationships among health, religiosity, and socioeconomic factors, a couple of patterns are noteworthy to further discuss. It was only true for non-Latino Whites that income has tended to become a stronger predictor of health, while for ethnic minorities the influence of income on health clearly has not changed across time. Although the relationship between income

and health has increased for non-Latino Whites over time, this is not a significant change over time. It is true that for ethnic minorities, the strength of this relationship maintains over time and income is therefore no more relevant for predicting health in the current era as it was in the previous time era. However, the impact that income has on health is not significantly stronger for non-Latino Whites than it is for ethnic minorities. This may be encouraging, as it implies that greater income, gaining wealth is just as powerful a vehicle toward better health for all ethnic minorities as it is for Whites. Another change over time worth discussing further is that education is not as strong a predictor of health as it was previously. Education historically has held a powerful role as a social determinant of health, as it provides better social opportunities that promote health (Robert Wood Johnson Foundation, 2009). However, the current study indicates that the strength of that relationship has declined significantly for the population as a whole and for Blacks in particular. American education no longer seems to foster health as effectively as it once did. Education, over time, is becoming a less and less powerful social determinant of health, across ethnic minorities.

Comparisons of religious attendance means

Following analyses of how the relationships among health, religiosity, and socioeconomic variables have changed across time, analyses to evaluate how the average levels of attendance and health have changed as a function of the four main factors were conducted. The average levels of attendance and health are significantly influenced by each of the four main factors of ethnicity, age, gender, and era, as well as by two-way interactions among these four factors. It was expected that ethnic minorities would continue to preserve higher religiosity than their non-Latino White peers, across age

group and gender. This hypothesis was confirmed. In terms of how attendance may be changing over time based on the four main factors, it was expected that attendance would decline in general, but that non-Latino Whites in particular would experience a greater, more drastic decline in attendance than ethnic minorities. This hypothesis was also confirmed though there was un unexpected difference in how the two minorities changed over time, as will be noted below. It was also predicted that ethnic minorities would be in poorer health than non-Latino Whites across age groups and genders. This hypothesis was also confirmed, even after adjusting for the lower education and income levels of the minorities. In terms of how health may be changing over time based on the four main factors, it was expected that ethnic minorities would decline in their health more drastically than non-Latino Whites. This turned out not to be the case for Blacks as their decline in health over eras was if anything slightly less than that of Whites. However, the declining health of Latinos over eras was clearly greater than that of the other two ethnic groups. Given the complexity induced by the large number of interactions observed in the current data, these will be considered in more depth.

The analyses of covariance on average attendance resulted in six significant two-way interactions. Focusing on each interaction, the ethnicity by age interaction on average attendance indicated that middle-age adults across ethnic groups have higher average attendance than younger adults, but the difference in attendance between the age groups is significantly different for each ethnic group. Post-hoc comparisons revealed that non-Latino Blacks and Latinos are similar to each other in terms of the difference in attendance between younger and older adults. Non-Latino Whites stand alone, as the difference in attendance between age groups for non-Latino Whites is much smaller

compared to ethnic minorities. It is unsurprising that ethnic minorities and middle-age adults prove to attend religious services more frequently than non-Latino Whites and younger adults. In particular, it is non-Latinos Whites who are unique, because they have the lowest average attendance and the smallest difference in average attendance between age groups. In other words, non-Latino Whites are attending religious services in a qualitatively different manner than ethnic minorities, and distinctively different when considering age. For non-Latino Whites, age does not make as much of a difference in attendance as it does for ethnic minorities.

The ethnicity by gender interaction on average attendance indicates that women, across ethnic groups, have higher average attendance than men, but the difference in attendance between genders varies across ethnic groups. Post-hoc comparisons revealed that non-Latino Whites and Latinos are similar to each other in terms of the difference in attendance between men and women. While Latinos are notably higher in attendance than non-Latino Whites, the way women's attendance increases compared to men's attendance is practically identical. In this case, non-Latino Blacks are unique, as there the difference in attendance between men and women is much greater compared to non-Latino Whites and Latinos together and separately. It is the unique attendance patterns of non-Latino Black women that seems to be driving this interaction. In the traditional Black Church, women are considered the backbone of the church, although they may not have formal leadership roles, they still hold a great deal of influence and power in their church communities.

The ethnicity by era interaction on average attendance revealed that attendance is much lower in the current era compared to the previous era, but the difference in

attendance between eras is significantly different for each ethnic group. Post-hoc comparisons reveal that once again, non-Latino Whites and Latinos are similar to each other in terms of the difference in attendance between eras. Once more, non-Latino Whites have much lower average attendance, but it is the way in which attendance has decreased across eras that makes non-Latino Whites practically identical to Latinos. The attendance patterns of non-Latino Blacks is unique compared to the other ethnic groups, because it remains relatively consistent over time. Non-Latinos Blacks are the most religious and most Protestant ethnic group in the nation, with the highest attendance rates, which seem to be persistent across time. Non-Latino Blacks not undergoing as much transformation in their religious landscape as other ethnic groups. This may be because unlike other ethnic groups, the traditional Black religion in general remains a very central part of and holds central significance in Black culture. Unlike Latino culture, which is currently undergoing a transformation especially in religion, for non-Latino Blacks, religious involvement and commitment persist as an integral part of Black culture. It may be that the spiritual-but-not-religious movement (Fuller, 2001) may not have affected Blacks in the same way it has the rest of the Nation. Religiosity could be a social resource that positively promotes better health that is more easily accessible than working to achieve better socioeconomic status. It may provide a way to cushion the social disadvantage that non-Latino Blacks encounter in society. That non-Latino Blacks have not experienced the secular decline of religiosity to the extent that other ethnic groups have could reflect a unique resiliency within this population. There may be something unique about non-Latino Black religion that has protected against the general trend of diminishing religiosity across time.

The remaining two-way interactions on average attendance reveal that average attendance follows some expected patterns when considering how age, gender, and era interact. The gender by age group interaction on attendance reveals that the difference in attendance between genders is greater among the middle age group than among the younger group, confirming a similar finding noted by Hunsberger (1985). This appears to be the general effect of age in which religiosity increases with age, even across genders. The general effect of gender (women being more religious) is intensified with age, as women continue with greater religiosity than men. The age group by era interaction on attendance reveals that average attendance was much higher in the previous era compared to the current era, but the difference in attendance between age groups was greater in the previous era. Over time, younger and middle-age adults approach a low level of average attendance, so age becomes less relevant for attendance in the current era. Similarly, the gender by era interaction on attendance revealed that the difference in attendance between genders was greater in the previous era than in the current era. Over time, men and women approach a lower average attendance and gender becomes less relevant for attendance. In both these last two interactions discussed, the overarching phenomenon appears to be this general decline in religious attendance over time, a strong and prominent secular trend in society that swept across gender and age.

Comparisons of health means

Following analyses on how the average levels of attendance vary and differ across race, era, gender, and age, analyses on how the average level of health may vary and differ across those main factors were carried out. Average health was significantly different across each of the four main factors, and further, as a function of certain

interactions among these four factors. An overall trend in the decline of subjective health was expected across ethnic groups; Over time, it was expected that average health would deteriorate. This was confirmed. In terms of expected differences among ethnic groups, non-Latino Whites would hold the best average health status of all other ethnic groups. In terms of change in health status over time, it was expected that the average health of non-Latino Whites would not deteriorate as greatly as the average health of ethnic minorities.

The analyses of covariance on average health resulted in four significant two-way interactions and one significant three-way interaction. Focusing on each interaction, the ethnicity by age group interaction on health is telling, because it shows that there is an overall decline in health with age, but that the changes in health with age differ across ethnic groups. Post-hoc comparisons reveal that the most obvious decline in health with age is for non-Latino Blacks, which places non-Latino Blacks in a unique position. Non-Latino Whites and Latinos, however, experienced a similar decline in their health with age. Although Latinos appear to retain their subjective appraisal of health to a slightly greater extent than non-Latino Whites with increasing age, these two populations are much more alike than they are different. Compared to non-Latino Blacks, these two ethnic groups are relatively healthier overall because their decline in health with age is not as great. Non-Latino Blacks seem to be at the worst disadvantage, not only because they hold the worst health among the middle-age group, but because the effect of age on health is intensified with them. What is it about the non-Latino Black experience that intensifies the effect of age on health? The weathering hypothesis proposes that due to the stressors of social disadvantage, Blacks may experience a premature aging of their

bodies, which causes them to deteriorate in health at a more accelerated rate (Geronimus, Hicken, Keene, & Bound, 2006).

The ethnicity by gender interaction on average health depicts a clear, undeniable distinction in health between non-Latino Whites and ethnic minorities. Post-hoc comparisons show that non-Latino Whites stand alone in this case since it is true only for non-Latino Whites that the difference in health between genders is practically non-existent. Non-Latino White men and women are both relatively at the same level of average health, while there are clear differences in health between genders for ethnic minorities. For ethnic minorities in particular, men report better health than women. Non-Latino Blacks (men and women) rate their health the worst, however, how non-Latino Black men and women differ in health is similar to how Latino men and women differ in health. Therefore, ethnic minorities are similar to each other, as ethnic minority men report being in better health than women. Completely unique are non-Latino Whites, who appear to demonstrate an equality in health among genders. Why is there such a great difference in health between genders for ethnic minorities and not Whites? Could it have something to do with the privileged roles that men have and that is emphasized more among ethnic minority cultures—the machismo among the Latino communities and the aggressive male among the Black community—that compels these ethnic minority men to believe they should be in better health? Is there truly greater gender equality for health among non-Latino Whites? These are questions that might be addressed in future research.

The ethnicity by era interaction on average health is intriguing, as it demonstrates how the average level of health has changed over time and how it varied by ethnic group.

Comparing the three ethnic groups to each other, Latinos were found to have a unique experience, unfortunately with the greatest decline in health over time. Overall, health has declined over time; across all ethnic groups, subjective health in the current era is worse than it was in the previous era. Post-hoc comparisons show that Latinos are very different from the other two ethnic groups, as the decline in health between eras is greatest among Latinos. Non-Latino Whites and Blacks have also experienced a worsening of health over time, with non-Latino Whites generally being in better health than non-Latino Blacks. Comparing non-Latino Whites and Blacks to each other, there is not much difference in how each ethnic group has experienced this decline in average health. It was expected that the decline in health over time would be significantly difference for non-Latino Whites compared to ethnic minorities. This was partially confirmed, as Whites' decline in health was significantly different from Latinos, although it was not very different from non-Latino Blacks. The most intriguing effect is how great the decline in health has been for Latinos, especially since Latinos once held the best health in the previous era and became similar to non-Latino Blacks in the current era. What is going on with Latino health? How could there be such a decrease? Considering the radically distinct social, political, and cultural landscape for Latinos in the previous era compared to the current era, Latino health might have been expected to change over time. In the current era, the percentage of Latinos has more than doubled compared to the previous eras. In the previous era, Latinos were more likely to be foreign born and have had the experience of being an immigrant compared to the current era, in which Latinos are more likely to be US born and experience American culture in a very different way from their immigrant parents. It could be Latinos in the previous era had more health

promoting and protective influences brought with them from a foreign culture and that those influences have diminished over time. It is complex, yet undeniable that Latino immigrants come bearing an advantage. Latino immigrants have resiliency, which provides them with a way to maintain relatively good health despite their social disadvantages; however, there are harmful and damaging influences Latinos seem to gain with more time in American culture or society (Abraido-Lanza et al., 2005). It is complex to begin to disentangle what occurs and how Latino immigrants' integration into American culture has deleterious effects on their health.

The story of Latino health continues with the ethnicity by age by era interaction, which gives more detail insight into how Latino health has changed over time. In this interaction, the general effect of declining health with age was obvious, which occurred across ethnic groups. However, over time, the decline in health with age differed by ethnic group, and the form of these simple two-way interactions changed across eras. Post-hoc comparisons revealed that non-Latino Blacks and non-Latino Whites are declining in health with increasing age similarly over eras. In other words, non-Latino Blacks and Whites experience a decline in health with age, with Blacks declining more than Whites, and the difference in the declines is about the same in both the previous and the current eras. Latinos, on the other hand, are distinctive, since their decline in health with age is not the same over eras compared to the other ethnic groups. In the previous era, Latino health for the younger group was comparable to that of the other ethnic groups but middle-age Latinos actually had the best health of any ethnic group. By contrast, in the current era, for the younger age group, Latinos held the worst health and for the middle age group their health approaches that of middle age Blacks, who have the

poorest health of any ethnic-age group category. Clearly a question to be addressed by future research is: What makes Latinos so unusual in this general decline in health over time, especially dramatic between age groups in the current era? Latinos, for whatever reason, are not aging as well as they used to.

Impact of religiosity on health across ethnic groups

Finally, one of the main points of this investigation was to assess whether the relationship between religiosity and health was significantly different across ethnic groups. According to this sample, the average religiosity and health indeed varied across ethnic groups, that is to say each ethnic group had a distinct and unique average level of religiosity and health. Ethnic minorities had higher levels of religious attendance and subjective religiosity, and non-Latino Whites had the highest level of subjective health. It was expected that, because of how distinct these ethnic groups were in their religiosity and health, the beneficial effects of religiosity on health would also be distinct for each ethnic group. Despite the significant differences in average attendance and health, the impact that religiosity has on health was just as strong for ethnic minorities as for non-Latino Whites. Analyses of covariance on health with the addition of religiosity variables as new covariates showed that the relationship between religiosity and health was not significantly different across ethnic groups. Although increased commitment to their religiosity might have given ethnic minorities a greater benefit on their health, the rate of change in health as a function of changes in their religiosity is the same as for non-Latino Whites. Each ethnic group does experience a protective effect of religiosity on health, and as was previously discussed, for all ethnic groups, the relationships between religiosity variables and health have strengthened over time. Yet, the positive impact of

religiosity on health remains consistent in strength across ethnic groups. Why is it that ethnic minorities are not gaining more from it? It may be that the religiosity of ethnic minorities is a protective cushion, which is giving ethnic minorities more benefit from higher religiosity, but just not enough to or offset all of the negative effects that their social disadvantage has on their health. Therefore, it is quite possible that if ethnic minorities had not had such high religiosity, their health may be even worse than it is.

Conclusion

In order to gain greater insight into what is most influential for the health outcomes of ethnic minorities, it may be crucial to look beyond those immediate influences on health (e.g., diet, exercise, and healthcare). Every person lives within their own unique social context, which has enormous consequences in determining a person's opportunities and challenges, especially for health. Often overlooked is how religiosity can be a social resource for health, by encouraging, promoting, and sustaining opportunities for health. In this investigation, the role of religiosity on health was explored, particularly how, because of distinct ethnic cultural backgrounds, the use, benefit, and effects of religiosity can be distinct across ethnic groups. This investigation was focused on depicting how American society has evolved and changed over time and comparing how relationships among health, religiosity, and socioeconomic variables vary across ethnic groups.

The relationships among health, religiosity, and socio-demographic variables were compared across time eras. Much has changed over time, in general and specifically by ethnic group. Over time, the relationship between religious attendance and health has strengthened, the relationships between socioeconomic factors and religiosity have

strengthened, and the relationship between education and health has weakened. For ethnic minorities, the relationships between socioeconomic variables and religiosity have strengthened dramatically, more so than for non-Latino Whites. Another central piece of this investigation was to explore how average religious attendance and average health can be impacted by ethnicity, age, gender, and era. For both attendance and health, ethnicity, age, gender, and era interact with one another. Finally, it was verified that the impact that religiosity has on health is not significantly different across ethnic groups. Although ethnic minorities have higher levels of religiosity, the benefit of religiosity on health is not any more or less strong for one ethnic group than another.

This investigation revealed that this interplay among these three main relationships: health and religion/religiosity, religiosity and ethnicity, and ethnicity and health, is complex and continues to evolve. Considering that greater health equity could result from exploring more in depth the determinants of the health of ethnic minorities, future investigations may consider turning attention toward the psychosocial factor of religiosity and its impact on health.

Appendices

Appendix A. List of original variables and variables developed from original variables

Variable	Mnemonic	Literal Question	Responses
Age of Respondent	AGE	Date of birth	18 years – 89+ years
Race of Respondent	RACE	What race do you consider yourself?	White
			Black
			Other
Country of family origin	ETHNIC	From what countries or part of the world did your ancestors come? If more than one country named: Which one of these countries do you feel closer to?	43 Countries of origin
Hispanic Specified	HISPANIC	Are you Spanish, Hispanic, or Latino/Latina? IF YES: Which group are you from?	50 Countries of origin
Inflation-adjusted family income	CONINC		Dollar value
Highest year of school completed	EDUC	What is the highest grade in elementary school or high school that you finished and got credit for? Did you ever get a high school diploma or a GED certificate? Did you complete one or more years of college for credit--not including schooling such as business college, technical or vocational school? How many years did you complete?	1 year – 20 years

Variable	Mnemonic	Literal Question	Responses
Condition of Health	HEALTH	Would you say your own health, in general, is excellent, good, fair, or poor	Excellent
			Good
			Fair
			Poor
How often attend religious services	ATTEND	How often do you attend religious services?	Never
			Less than once a year
			Once a year
			Several times a year
			Once a month
			2-3 times a month
			Nearly every week
			Every week
			More than once a week
Strength of affiliation (subjective religiosity)	RELITEN	Would you call yourself a strong (preference named or denomination) or a not very strong (preference named or denomination)?	Strong
			Somewhat strong
			Not very strong
			No religion
Ethnic/Racial identity	RACE4	Variable generated from the variables RACE, ETHNIC, & HISPANIC	Non-Latino White
			Non-Latino Black
			Latino
			Other
Time Era	ERA	Variable generated to create two time periods	Previous era 1972-1992
			Current era 1994-2010
Age category	AGE_CAT	Variable generated to create two age categories	Younger 18-39 years
			Middle age 40-65 years

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