AN ANALYSIS OF RELIGIOSITY IN THE UNITED STATES: TESTING THE SECURE SOCIETY THEORY

by

James R. Liddle

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This thesis was prepared under the direction of the candidate's thesis advisor, Dr. David F. Bjorklund, Department of Psychology, and has been approved by the members of his supervisory committee. It was submitted to the faculty of the Charles E. Schmidt College of Science and was accepted in partial fulfillment of the requirements for the degree of Master of Arts.

SUPERVISORY COMMITTEE:

David F. Bjorklund, Ph.D.
Thesis Advisor

Robin R. Vallacher, Ph.D.

Ryne Sherman, Ph.D.

David L. Wolgin, Ph.D.
Chair, Department of Psychology

Russell Ivy, Ph.D.
Interim Dean, Charles E. Schmidt College of Science

Deborah L. Floyd, Ed.D.
Interim Dean, Graduate College

11/6/2014
Date

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ABSTRACT

Author:	James R. Liddle
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Co-Advisor:	Dr. Todd K. Shackelford
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The current study sought set to replicate and extend previous findings regarding Norris and Inglehart's (2004) "Secure Society Theory" (SST) of religiosity, which states that religiosity varies as a function of the extent to which one feels secure in their environment. However, the relationship between individual perceptions of societal security—as opposed to national indicators—and religiosity has yet to be tested. The current study addressed this by analyzing data from the General Social Survey, supplemented by FBI and U.S. Census data.

Results indicated that the extent to which one feels safe walking around their neighborhood at night is a significant predictor of religiosity, even when crime rate, poverty rate, age, sex, and race are also considered. Additionally, time series analyses of data from 1980 to 2012 with a lag of 10 years provided partial support for SST, with neighborhood fear and poverty significantly predicting future religiosity.

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I. INTRODUCTION

Religious beliefs and behaviors, although they exist in a variety of forms (Moro & Myers, 2010; Smith, 1991) and may not always be viewed as a formal "religion" by their practitioners, appear to be a human universal (Atran, 2002; Norenzayan, 2010). Although there is considerable debate regarding how to define religion, the assertion of religion's universality is based on a reasonable definition by Atran (2002) that is broad enough to avoid excluding less "traditional" religions and comprises four components:

> 1. Widespread counterfactual belief in supernatural agents (gods, ghosts, goblins, etc.)
>
> 2. Hard-to-fake public expressions of costly material commitments to supernatural agents, that is, sacrifice (offerings of goods, time, other lives, one's own life, etc.)
>
> 3. A central focus of supernatural agents on dealing with people's existential anxieties (death, disease, catastrophe, pain, loneliness, injustice, want, loss, etc.)
>
> 4. Ritualized and often rhythmic coordination of 1, 2, and 3, that is, communion (congregation, intimate fellowship, etc.) (p. 13)

These components exist—in some form—in all known societies, converging into what may reasonably be defined as "religion."

However, despite the apparent universality of religion, the *degree* of religiousness (i.e., religiosity) varies considerably across individuals, societies, and time. For example, Sweden and Denmark are among the least religious nations on the planet (excluding nations with state-imposed atheism, which do not accurately represent the religiosity of

the populace), with studies reporting a range of 46–85% of Swedes and 43–80% of Danes as nonbelievers in God (Zuckerman, 2007). These percentages may be large when compared to other nations, but they also highlight the substantial variability in religiosity at the individual level. Even though these societies are highly secular, there still exists a substantial portion of highly religious individuals in the population (Zuckerman, 2008). Furthermore, this predominant secularism has not been constant throughout these nation's histories, as Zuckerman (2008) notes that in the late 1700s and 1800s, "…there is no question that heartfelt, faithful Christianity was discernibly pervasive in various parts of Denmark and Sweden," and "…ever since sociologists began collecting data on religion in Denmark and Sweden—which, admittedly, really wasn't that long ago—the clear pattern has been that of decline, in both belief and participation" (p. 125).

Besides Denmark and Sweden, developed, post-industrial nations generally tend to exhibit lower religiosity than less-developed nations (Norris & Inglehart, 2004; Zuckerman, 2009). The United States, however, appears to be an exception. Recent estimates of the percentage of atheists, agnostics, or nonbelievers in the United States range from 3–9%, which places the U.S. in 44th—between Portugal and Albania—on a list of the top 50 countries with citizens self-identified as such (Zuckerman, 2007). Nevertheless, U.S. religiosity has been declining in recent decades. An analysis of the 1990, 2001, and 2008 waves of the American Religious Identification Survey (ARIS) indicates that the percentage of Americans designated as religious "nones" (i.e., those who do not identify with any particular religion) increased from 14.3 million Americans (8.2% of the population) in 1990 to 34.2 million (15%) in 2008 (Kosmin & Keysar, 2009).

How can we explain this individual, societal, and temporal variability in religiosity? Although historical and cultural factors clearly play a role in shaping individual and societal religiosity over time, it can also be useful to analyze religion from an evolutionary perspective.

Evolutionary Psychology and its Application to Religion

Evolutionary psychology is not a sub-discipline of psychology, such as social psychology or personality psychology, but rather an *approach* to psychology that applies evolutionary theory. Evolutionary psychology is founded on the premise that the brain, like every other organ, has evolved and is therefore open to analysis from an evolutionary perspective, which means that the products of the brain (i.e., thoughts, feelings, behaviors) are open to evolutionary analysis. For example, an evolutionary psychological approach has proven useful in examining social behavior (Cosmides, 1989; Kenrick, Maner, & Li, 2005), learning (MacDonald, 2007; Weber & Depew, 2003), memory (McBurney, Gaulin, Devineni, & Adams, 1997), development (Bjorklund & Pellegrini, 2000), and perception (Rhodes, 2006), to name a few diverse topics. In short, all aspects of psychology have the potential to be better understood by examining them from an evolutionary perspective, and religious beliefs and behaviors are no exception.

Evolutionary psychologists argue that the mind is composed of a large number of evolutionary psychological mechanisms (EPMs) shaped throughout evolutionary history to solve specific, recurrent adaptive problems of survival and reproduction. Although the number of EPMs that exist and the typical scope of such mechanisms (i.e., domain-specific vs. domain-general) are still subjects of lively debate, a less controversial aspect of this view is the description of EPMs as information-processing mechanisms that are

sensitive to specific types of information (i.e., environmental stimuli, physiological activity, output from other parts of the brain); this information is processed, resulting in a specific type of output (i.e., physiological activity, input to other EPMs, or manifest behavior) (Buss, 2011).

From this conceptual foundation, one can examine religious beliefs and behaviors by considering the possible evolved psychological mechanisms that produce such output. Identifying the types of information—particularly environmental input—that influence religiosity can aid in identifying the mechanisms involved in producing religious beliefs/behaviors and the functions of these mechanisms, which can ultimately aid in determining whether religious beliefs/behaviors are adaptive output of these mechanisms or a byproduct (i.e., output that is merely a consequence of the mechanism's design rather than the adaptive output that the mechanism was selected for).

Although the present study tests a theory of religiosity that was not developed by evolutionary psychologists, an evolutionary perspective can nevertheless be helpful in understanding the theory's predictions and interpreting findings related to this theory.

Secure Society Theory (SST)

In their book *Sacred and Secular*, Norris and Inglehart (2004) proposed a revised theory of secularization that could potentially explain the variability in religiosity between nations as well as societal changes in religiosity over time. They argue that a key factor driving secularization is the level of security provided by a society, which influences individuals' "existential security," or "…the feeling that survival is secure enough that it can be taken for granted" (p. 4). Hence, their theory is referred to throughout this paper as "Secure Society Theory" (SST).

SST is built upon two premises, referred to by Norris and Inglehart (2004) as "the Security Axiom" and "the Cultural Traditions Axiom" (pp. 13-18). The Cultural Traditions Axiom does not play a large role in SST's explanation of secularization, but rather emphasizes that the religious worldviews of a society shape that society's culture in ways that subsist even as that society moves toward secularization (e.g., the Protestant work ethic). More relevant to explaining religious variability and change over time is the Security Axiom, which states that substantial variability exists between societies with regard to the level of security (i.e., people's vulnerability to risks and dangers, such as environmental disasters, diseases, crime, human rights violations, poverty, etc.), and the societal shifts from agrarian to industrial and from industrial to post-industrial tend to significantly improve societal security. In particular, the first stage of modernization (agrarian to industrial) serves to lift developing nations out of extreme poverty, aiding the most vulnerable portions of the population and generally improving the standard of living. As societies develop, there are typically improvements regarding nutrition, sanitation, access to clean water, healthcare, and education, as well as improved mass communication. These changes are all likely to have a positive impact on individuals' perceptions of security (i.e., existential security).

However, Norris and Inglehart (2004) acknowledge that societal development does not inevitably lead to greater security, at least not for all citizens. This makes sense when considering SST from an evolutionary perspective. If the mechanisms that produce religious beliefs and behaviors are sensitive to information regarding societal security, then even a prosperous, developed nation can have a religious populace if cues to insecurity are present. For example, certain events can have significant negative impacts

on any nation regardless of their level of development (e.g., natural disasters, war, recession), which will impact individuals' perceptions of security. Economic inequality is also an important factor to keep in mind, as a substantial portion of the population may continue to suffer from threats to their security while a small "elite" class of citizens reaps the benefits of development.

Using the Security Axiom and Cultural Traditions Axiom as their foundation, Norris and Inglehart (2004) hypothesize that the variability in security between societies, resulting from varying levels of development and historical events, can partially explain the variability in religiosity between societies, with greater security leading to increased secularization. More specifically, they predict that greater security will result in weaker religious beliefs, values, and participation, and that differences in religiosity should be most pronounced between agrarian, industrial, and post-industrial societies.

This relationship between religiosity and security is based on the argument that as individuals' perceptions of security increase, their need for religion decreases, as religion—particularly the supernatural beliefs connected to religion—serves as a coping mechanism for living in less secure and unpredictable conditions. This idea of supernatural beliefs serving to cope with uncertainty was originally put forth by Malinowski (1954) and has since been supported by a variety of studies. For example, regular church attendance has been linked to a reduced incidence of depression, suggesting a better ability to cope with stress (McCullough & Larson, 1999), and several studies have indicated that individuals have a tendency to compensate for uncertainty, ambiguity, and reduced feelings of control through superstitious (Burger & Lynn, 2005; Case, Fitness, Cairns, & Stevenson, 2004; Keinan, 2002) and religious (Frijters & Baron,

2010; Kay, Gaucher, McGregor, & Nash, 2010; Kay, Moscovitch, & Laurin, 2010; Kay, Whitson, Gaucher, & Galinsky, 2009) beliefs and behaviors. Research by Whitson and Galinsky (2008) has even shown that the experience of lacking control can increase the perception of illusory patterns, including developing superstitions and forming illusory correlations regarding stock market data. In evolutionary terms, these findings suggest that religion serves as an adaptation (i.e., that religious beliefs and behaviors are adaptive output of psychological mechanisms responding to environmental threats), a view that is implicitly promoted by SST and is further considered in the Discussion section of this paper.

Norris and Inglehart (2004) expand upon the hypothesized relationship between security and religiosity by also noting that societal changes in security are not expected to have an immediate impact on individuals' religiosity, but rather that these effects should take time:

> …basic values do not change overnight; instead, socialization theory suggests that we should find a substantial time lag between changing economic circumstances and their impact on prevailing religious values, because adults retain the norms, values, and beliefs that were instilled during their formative pre-adult years. (p. 28)

Therefore, if SST is correct, it should be possible to observe changes in religiosity over time that correspond to societal changes in security, though such a relationship would only be possible to discern through consistently-gathered data over an adequate length of time. Evidence regarding this prediction, along with the general hypothesized relationship between security and religiosity, is discussed next.

Evidence Supporting SST by Norris and Inglehart

Norris and Inglehart (2004) conducted a series of analyses to test SST. Their primary source of data for religiosity was the pooled World Values Survey/European Values Survey conducted in four waves from 1981 to 2001. This data set provided data from 76 nation-states, which Norris and Inglehart disaggregated into 79 societies (splitting Germany into East and West, the U.K. into Great Britain and Northern Ireland, and the Federal Republic of Yugoslavia into Serbia and Montenegro). However, not all nations were included in each wave, so time-series analyses were limited to 20 societies.

The specific measures of religiosity included religious participation, both collective (attending religious services) and personal (prayer frequency), religious values (the importance of religion in one's life), and religious beliefs (belief in God, heaven/hell, life after death, and existence of the soul). Regarding societal security, Norris and Inglehart categorized societies as agrarian (n = 23), industrial (n = 33), and post-industrial (n =23) based on the Human Development Index, a 100-point scale of societal modernization published annually by the United Nations Development Program. This measure combines levels of knowledge (adult literacy and education), health (life expectancy at birth), and standard of living (real per capita GDP). Additional measures of security/development drawn from a variety of sources included the proportion of the population living in rural and urban areas, the Gini coefficient of economic inequality, access to mass communications, the number of HIV/AIDS cases, access to an improved water source, immunization rates, the distribution of physicians, and average life expectancy at birth.

Norris and Inglehart first examined differences in religiosity between agrarian, industrial, and post-industrial nations. As predicted by SST, religious participation, values, and beliefs were strongest in agrarian societies and weakest in post-industrial societies (see Table 1). For example, 54% of respondents in agrarian societies reported praying every day, compared to 34% and 26% of those living in industrial and post-industrial societies, respectively.

Norris and Inglehart then conducted correlational analyses between the various measures of security/development and religious behavior (attending religious services and prayer frequency). These results also supported SST, with each societal indicator being significantly correlated with both religious participation and prayer frequency in the predicted direction: as societal conditions improve, religiosity decreases. The correlations ranged in strength from .41 to -.74. For example, the Human Development Index was negatively correlated with both religious participation and prayer frequency, *r*s = -.53, *p*s < .001.

Norris and Inglehart also examined historical trends regarding religiosity, specifically the annual trends in regular (weekly) religious service participation from 1970–1998 for 13 European societies. For each society, the year of the survey was regressed on the proportion of respondents reporting weekly religious service attendance. Every model resulted in a negative regression coefficient, and this result was statistically significant for nine of the societies analyzed. Although these results show that religiosity is in decline in these European societies, the analyses did not consider the possible causal effect of societal security on these declines.

Finally, Norris and Inglehart note that the United States appears, at first glance, to represent an exception to their theory. Although U.S. religiosity is declining, it remains an outlier compared to most other post-industrial nations. The high level of religiosity observed in the United States seemingly contradicts SST, as the United States is a successful post-industrial nation. However, when the United States is analyzed in terms of societal indicators of *security*, the high rates of religiosity are less anomalous. For example, Norris and Inglehart highlight that the United States exhibits greater economic inequality (as measured by the Gini coefficient) than any other post-industrial nation included in their analysis. They further state that:

> Many American families, even in the professional middle classes, face risks of unemployment, the dangers of sudden ill health without adequate private medical insurance, vulnerability to becoming a victim of crime, and the problems of paying for long-term care of the elderly. (p. 108)

Although Norris and Inglehart do not analyze these additional factors and their relationship to religiosity statistically, they make a strong case for the value of SST in understanding religiosity in the U.S., as well as throughout the world. Nevertheless, it is important to consider additional evidence regarding the validity of SST.

Additional Supporting Evidence of SST

Since Norris and Inglehart's (2004) initial presentation of their theory, several researchers have further tested SST either implicitly or explicitly. For example, Paul (2005) tested the hypothesis that popular religiosity is beneficial to society by examining rates of religious belief and practice along with several indicators of societal health and dysfunction (homicide, youth suicide, STD prevalence, teen pregnancy and birth, and

abortion rates) in 18 developed democracies, including the United States. Paul (2005) concluded that "higher rates of belief in and worship of a creator correlate with higher rates of homicide, juvenile and early adult mortality, STD infection rates, teen pregnancy, and abortion in the prosperous democracies" (p. 7). Furthermore, the United States stands out as an outlier regarding most societal indicators of dysfunction, with U.S. homicide rates, STD infection rates, early adolescent pregnancies, and abortion rates much higher than in the other countries analyzed.

Given the fact that the United States is such an extreme outlier among prosperous democracies regarding several indicators of societal security, it is important to consider whether the observed relationship between religiosity and security is being driven primarily by the inclusion of the United States in statistical analyses. This possibility was considered in a later study by Paul (2009), in which analyses similar to those conducted earlier (Paul, 2005) were performed with and without the United States included. The newer study also included the creation of a "Successful Societies Scale" (SSS) based on over two dozen indicators—several of which were used in Paul's 2005 study—and a "Popular Religiosity versus Secularism Scale" (PRVSS) comprising seven measures of religiosity and secularism (absolute belief in a supernatural creator deity, Biblical literalism, religious service attendance, prayer frequency, belief in an afterlife, self-reported agnosticism/atheism, and acceptance of human descent from animals). Higher scores on the SSS indicated less societal dysfunction, and higher scores on the PRVSS indicated higher levels of secularization. Results indicated that the SSS was significantly positively correlated with PRVSS, both with the United States included ($r = .71$, $p < .001$) and without ($r = .53$, $p < .01$), though the relationship is noticeably larger with U.S.

inclusion. These results are in line with Secure Society Theory, as many of the societal measures used can be considered indicators of societal security (e.g., homicides, incarcerations, life expectancy, infant mortality, human poverty index), and the relationship to religiosity does not appear to be solely driven by the United States.

A study by Rees (2009) further tested SST with an analysis of 55 countries. Importantly, this study also tested alternative explanations for changes in religiosity: the traditional modernization theory of secularization and Rational Choice Theory, which states that secularization occurs "due to competition for attention from secular services and the provision of unattractive products by the monopoly of religious providers" (Rees, 2009; p. 2). After establishing economic inequality—measured by the Gini coefficient—as a reasonable proxy for personal insecurity due to its correlation with several societal indicators of security, Rees (2009) developed a model with economic equality and variables related to the alternative explanations of secularization (governmental and social regulation of religion, religious fractionalization, and per capita GDP) as predictors of religiosity. Results supported SST, indicating that while taking into account other variables, economic inequality remained a unique predictor, and was indeed the strongest predictor.

A study by Barber (2011) provides further support for the link between economic inequality— as well as other variables likely to influence existential security—and religiosity. As a measure of religious *disbelief*, this study relied on the proportion of the population reporting that they do not believe in God, as compiled by Zuckerman (2007) for 137 countries. Barber (2011) controlled for the effect of living in Communist societies (where religious beliefs are criminalized) and Islamic states that follow Sharia law (where

atheism is criminalized). Independent variables included economic development measured in terms of the proportion of the labor force employed in agriculture and third-level education enrollment, economic security measured in terms of the Gini coefficient and the level of personal taxation (a proxy for the extent of the welfare state), and health security measured in terms of the severity of 22 parasites (i.e., "pathogen prevalence") as reported by Fincher and Thornhill (2008). Results indicated that religious disbelief was significantly correlated with all of the independent and control variables, and these variables were all significant predictors of religious disbelief in regression analyses, explaining 75% of the variance in disbelief.

Pesta, McDaniel, and Bertsch (2010) provided an indirect test of SST by creating an index of well-being for the United States, using the 50 states as the unit of analysis. They identified six "sub-domains" of subjective well-being for which state-level data are available: religiosity, health, crime, education, income level, and *g*, or general intelligence. Although religiosity was included because of its documented positive effect on well-being (see Pesta et al., 2010), correlational analyses indicated that religiosity was positively correlated with the only sub-domain representing lower well-being—crime—and negatively correlated with every other sub-domain representing greater well-being. In other words, although religiosity has beneficial effects on well-being at the individual level, higher levels of religiosity are associated with low state-level well-being. This apparent contradiction is fully consistent with SST, as individuals living in states with stronger indicators of low well-being (e.g., higher crime rates, lower health, lower education, etc.) are expected to exhibit greater religiosity as a way to cope with these conditions.

Finally, a study by Solt, Habel, and Grant (2011) analyzed economic inequality and religiosity over time, providing a test of the temporal component of SST (i.e., changes in societal security result in changes in religiosity over time). Solt et al. analyzed data over a 50-year period, from 1955–2005. Grant's (2008) Aggregate Religiosity Index (ARI), which provides a single value of national religiosity for each year based on available survey data, was used as the measure of religiosity, and economic inequality was measured by the Gini coefficient. GDP per capita was also included in their analysis. In order to test the effects that these variables have on each other over time, Solt et al. (2011) analyzed these data with vector autoregression, a form of time series analysis that comprises a series of regression equations. Each variable under consideration serves as the predictor in one of the equations. More specifically, a time-lagged version of each variable serves as a predictor in order to determine whether it can predict future values of the other variables. The analyses indicated that GDP per capita negatively predicts future religiosity, whereas economic inequality positively predicts future religiosity (i.e., as inequality increases, future religiosity increases). However, the time lag considered in this analysis was only 1 year, as pre-analysis testing indicated this was the most appropriate lag. Therefore, although the results are in the direction predicted by SST, such a short time lag does not provide a proper test of SST's prediction regarding gradual historical change in religiosity.

The Present Study

One major limitation of the previous research on SST is the lack of direct data regarding *existential security* (i.e., people's personal *perceptions* of security). Rather, religiosity has been linked to societal indicators of security. Though this type of

investigation is important for testing SST, as existential security should be strongly tied to societal conditions, it is still necessary to demonstrate the link predicted by Norris and Inglehart (2004) between *personal* perceptions of security and religiosity.

Another limitation of previous studies is the lack of time series analyses, since SST predicts that changes in security over time will lead to changes in religiosity. Although Norris and Inglehart (2004) do analyze historical changes in religiosity, they do not examine the predicted causal relationship between security and religiosity over time. Solt et al. (2011) attempted to fill this gap, but their time series analysis relied on a time lag of 1 year. Although their results supported the predicted causal relationship between security and religiosity, their chosen time lag is not consistent with the gradual (i.e., generational) change predicted by SST.

The present study attempts to address these limitations as well as replicate previous findings regarding SST by analyzing religiosity, societal security, and perceptions of security in the United States from 1972–2012 through use of the General Social Survey (Smith, Marsden, Hout, & Kim, 2013) and data from the FBI and U.S. Census. Since SST predicts a negative relationship between societal security and religiosity, another way of putting this is that SST predicts a positive relationship between societal *insecurity* and religiosity. This is how the relationship was framed in the present study, due to the types of variables that were analyzed.

With the above goals in mind, the present study sought to test three hypotheses. By including a measure of personal perception of insecurity, the current study tested the prediction that personal perceptions of insecurity are positively related to self-reported religiosity (Hypothesis 1). This personal measure was analyzed along with societal

indicators of insecurity used in previous studies (crime rates and poverty rates) to test the prediction that both personal perceptions and societal indicators of insecurity uniquely predict self-reported religiosity (Hypothesis 2). Finally, religiosity and insecurity were analyzed at a national level over time to test the prediction that insecurity positively predicts future religiosity (Hypothesis 3).

II. METHOD

Data Sets and Variable Selection

In order to test the Secure Society Theory as it applies to religiosity in the United States, data were obtained from several data sets. These data sets, and the relevant variables from these data sets that were analyzed in the present study, are described below (see Table 2 for a summary of these variables).

The General Social Survey. For variables regarding religiosity, and one variable regarding perceptions of societal insecurity, the present study relied on data obtained from The General Social Survey (GSS). This sociological survey was conducted almost annually from 1972 to 1994 (excluding 1979, 1981, and 1992, due to funding limitations), and biennially from 1994 to the present (although data from 2014 are not yet available), by the University of Chicago's National Opinion Research Center (NORC), and it serves as a valuable source of time-series data on American demographic characteristics and attitudes on a wide range of topics.

The GSS is a roughly 90-minute, in-house interview of a probability-based sample of non-institutionalized U.S. adults who are 18 years of age or older. From 1972 to 1993, for each year the survey was conducted, the target sample size was 1,500 participants, with actual sample sizes ranging from 1,372 in 1990 to 1,613 in 1972. Since 1994, the GSS has been administered to two samples each year the survey is conducted, each with a target size of 1,500 participants. Actual sample sizes have ranged from 2,765 in 2002 to 2,992 in 1994. Aside from an oversampling of black participants in 1982 and

1987 (which is statistically controlled for in the present study's analyses), there has been no oversampling in other periods.

The samples used in the GSS are derived from the NORC national sample frame, which was created in 1970 and updated in 1980 and 1990 based on new U.S. Census data. These sample frames are built in a series of stages, initially consisting of Standard Metropolitan Statistical Areas (SMSAs) and nonmetropolitan counties covering the total United States. At the first stage, Primary Sampling Units (PSUs) are designated by stratifying the SMSAs and counties (by region, age, and race in 1970, resulting in 100 PSUs, and by a larger number of strata and control variables in 1980 and 1990, resulting in 84 and 100 PSUs, respectively). These PSUs are then further divided into blocks or enumeration districts (EDs), with the number of selections proportional to the size (in number of households) of the PSU. As Smith et al. (2013) explain:

> Thus, the principal NORC national probability sample is, in effect, an inventory of identifiable households, each with a known probability of selection. In a typical sample survey with equal probability of selection for individual households … households at which interviews will take place are probabilistically selected from the available lists of addresses for blocks and EDs. The method of probabilities proportional to size results in the assignment of approximately equal numbers of interviews in each final stage cluster, which in turn leads to increased precision in the estimation of overall population characteristics. (p. 2098)

Due to funding limitations, the 1972–1974 GSS used a modified probability design, relying on quota sampling at the block level, with quotas based on sex, age, and employment status. Interviewers would begin from the northwest corner of a block or

ED, traveling in a specified direction until the quotas were filled. From 1975 to 2002, the GSS used full-probability samples with predesignated respondents. Beginning in 2004, NORC introduced a new method of sampling frame construction and sample design. The important changes from previous methods include the following: the construction of a new list-assisted sampling frame for 72% of the population, which allows re-design and re-targeting of the sample for each consecutive GSS at low cost; an increase in the size of the certainty stratum ("The proportion of the population covered by certainty area selections"; Smith et al., 2013, p. 2104), which now includes roughly half (45%) of the housing units in the population; within the certainty stratum, the PSUs being used are now tracts containing 1000–2000 housing units rather than blocks or EDs (which had a minimum size of 75 housing units), which decreases intracluster correlation coefficients.

Another change in sampling procedure from 2004 onward is the adoption of a nonrespondent sub-sampling design. As Smith et al. (2013) explain, "Subsampling allows the focusing of resources on a smaller set of the difficult cases for further attempts, thereby potentially reducing both response error and nonresponse bias" (p. 2108). However, this necessitates the weighting of data from 2004 onward in order to keep the design unbiased. The GSS data set provides several weight variables that can be used for this purpose. The present study weighted the entire 1972–2012 GSS data set by the WTSSALL variable. This variable is a modified version of the WTSS variable, which takes into account the sub-sampling of nonrespondents and the number of adults in the household. WTSS assigns a "1" to all cases prior to 2004 so that they are effectively unweighted. However, the issue of number of adults per household applies to earlier years as well. Since the unit of selection for the GSS is household, and since households

vary in the number of eligible participants (only one adult is interviewed per household), persons in larger households are less likely to be interviewed. WTSSALL applies the same weights as WTSS for 2004 and beyond, but also accounts for the number of adults per household for surveys prior to 2004.

With the WTSSALL weight applied and the oversampling of black participants corrected for (these adjustments apply to all subsequent analyses), the 1972–2012 GSS data set consists of a total of 56,355 participants (25,804 men, 30,551 women). The mean age of participants is 44.37 years (*SD* = 17.00, range = 18-89). The majority of participants (82.2%) are identified as white (*n* = 46,328), with 6,906 participants (12.3%) identified as black and 3,120 participants (5.5%) identified as "other." The primary religious identifications of participants are as follows: 32,289 Protestant, 14,533 Catholic, 1,111 Jewish, and 5,994 "none" (see Table 3 for a complete list of religious affiliations).

NORC does not provide data on the state that each participant resides in. Rather, the residence of participants is coded into nine regions: *New England* (Connecticut, Maine, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), *Middle Atlantic* (New Jersey, New York, Pennsylvania), *East North Central* (Illinois, Indiana, Michigan, Ohio, Wisconsin), *West North Central* (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota), *South Atlantic* (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia), *East South Central* (Alabama, Kentucky, Mississippi, Tennessee), *West South Central* (Arkansas, Louisiana, Oklahoma, Texas), *Mountain* (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming), and *Pacific* (Alaska, California, Hawaii, Oregon, Washington). This unfortunately reduces the amount of regional variability in religiosity

and security that can be analyzed, but still provides more detail than data at the national level.

The interviewers who conduct the GSS are hired and trained by area supervisors in interviewing locations. They are given a training quiz regarding the sampling procedures and complete one practice interview that is evaluated at NORC. After successfully completing these prerequisites, actual interviewing commences. Interviewers are given a list of specifications to assist them with gathering answers for certain questions. These specifications describe the intent of the questions and provide probes or interpretations that can be provided to the participant if they do not understand the question. These specifications are designed to increase the internal validity of the collected data. The questions on the GSS are of two broad types: Participants either simply provide an answer and the interviewer is responsible for assigning the appropriate code to the response, or participants are given a hand card with a list of possible responses to choose from. In 2002, the GSS switched from printed questionnaires to computer-assisted Personal Interviewing (CAPI), but hand cards are still provided to participants for relevant questions.

Measures of religiosity. The following variables from the GSS were used as measures of religiosity for the present study. Although other variables related to religion are available in the GSS, these were chosen because they were included in the greatest number of surveys from 1972–2012.

Religious attendance. Participants were asked "How often do you attend religious services?" and responses were coded on a scale of 0 to 9 (0 = "Never," 1 = "Less than once a year," 2 = About once or twice a year," 3 = Several times a year," 4 = "About

once a month," 5 = "2-3 times a month," 6 = "Nearly every week," 7 = "Every week," 8 = "Several times a week," 9 = "Don't Know" or no answer). Participants were not provided a hand card with these options, but interviewers were instructed to use these categories as probes if necessary. This question has been asked every year the GSS is conducted, resulting in 29 years in which data have been collected over a 40-year period (valid *n* = 55,821; 534 cases of "Don't know" or no answer).

It is worth noting that research has shown that participants have a tendency to overstate the frequency of attendance, in both the GSS and other surveys, such as Gallup polls (Hadaway, Marler, & Chaves, 1993). The principal investigator of the GSS has acknowledged this issue and explains it as a result of three factors: social desirability bias, telescoping, and participants relying on a broader interpretation of "attend[ing] religious service" (Smith, 1996). However, these data can still be used to analyze changes over time and relationships with other variables because the difference between reported attendance and actual attendance (which has been more accurately measured with time diary studies) has remained consistent in recent decades (Chaves, 2011).

Prayer frequency. Participants were asked "About how often do you pray?" and responses were coded on a scale of 1 to 6 (1 = "Several times a day," 2 = "Once a day," 3 = "Several times a week," 4 = "Once a week," 5 = "Less than once a week," 6 = "Never"). Participants were not provided a hand card with these options, but interviewers were instructed to use these categories as probes if necessary. The GSS began asking this question in 1983, but it was not included in 1986 and 1991, resulting in 18 years in which data have been collected over a 29-year period (valid *n* = 27,816; 324 cases of "Don't know" or no answer).

These data were reverse-coded in the present study so that greater values indicate higher levels of prayer frequency. Additionally, for data from 1983, "Never" responses were collapsed with "Less than once a week." This was recommended by Smith (1988) due to an unusually high number of "Never" responses coded in that year. Although the wording of the question and instructions for interviewing and coding were not changed, it is possible that the discrepancy was due to inadequate interviewer training or inadequate care by the coding supervisor.

Biblical fundamentalism. Participants were asked "Which of these statements comes closest to describing your feelings about the Bible?" and responses were coded on a scale of 1 to 4 (1 = "The Bible is the actual word of God and is to be taken literally, word for word," 2 = "The Bible is the inspired word of God but not everything in it should be taken literally, word for word," 3 = "The Bible is an ancient book of fables, legends, history, and moral precepts recorded by men," 4 = "Other" [volunteered]). The first three options were provided to participants on a hand card. The GSS began asking this question in 1984, but it was not included in 1986, resulting in 18 years in which data have been collected over a 28-year period (valid n = 27,618; 349 cases of "Other," 644 cases of "Don't know" or no answer). These data were reverse-coded in the present study so that greater values indicate higher levels of fundamentalism. Responses of "Other" were excluded from analyses due to a lack of information on what those responses entail.

Strength of affiliation. Participants who indicated any religious preference were asked "Would you call yourself a strong (preference named) or a not very strong (preference named)?" and responses were coded on a scale of 1 to 4 (1 = "Strong," 2 =

"Not very strong," 3 = "Somewhat strong" [volunteered], 4 = "No religion"). Participants were not provided a hand card with these options, but interviewers were instructed to use these categories as probes if necessary. Interviewers were instructed to refer to the religious preference previously identified by the participant when asking this question. If participants indicated that they follow no religion, this question was not asked. The GSS began asking this question in 1974 and it has been asked every year since, resulting in 27 years in which data have been collected over a 38-year period (valid n = 51,436; 1,797 cases of "Don't know" or no answer). These data were reverse-coded in the present study so that greater values indicate a greater strength of affiliation. Also, the order of the "not very strong" and "somewhat strong" categories were switched to more accurately reflect a scale of increasing religiosity. Therefore, the final coding as used in the present study is as follows: 1 = "No religion," 2 = "Not very strong," 3 = "Somewhat strong," and 4 = "Strong."

Religiosity component. To facilitate analyzing the effects of several variables on religiosity, the present study considered whether religious attendance, prayer frequency, biblical fundamentalism, and strength of affiliation could be combined into a single religiosity composite variable. A principal components analysis was conducted on these variables, with extraction based on Eigenvalues greater than 1. The number of factors to extract was not fixed beforehand. Two measures of sampling adequacy, Kaiser-Myer-Olkin (KMO) and Bartlett's test of sphericity, indicated that it was appropriate to proceed with principal components analysis, as KMO was greater than 0.5 (KMO = 0.760) and Bartlett's test of sphericity was significant ($p < .001$).

The four religiosity variables are all significantly correlated (see Table 4). The principal components analysis yielded a single component with an Eigenvalue of 2.44, explaining 61.04% of the variance. The second largest Eigenvalue was 0.69 and, therefore, was not extracted (see Figure 1 for scree plot). The principal component communalities were .690 for religious attendance, .629 for prayer frequency, .436 for biblical fundamentalism, and .687 for strength of affiliation. Thus, the majority of the variance of these variables is accounted for by a one-component solution, although variance in biblical fundamentalism is not accounted for as strongly as the other variables. Nevertheless, it is reasonable to consider these four variables as part of a single religiosity component. Therefore, a single religiosity variable was constructed by first calculating *z*-scores for each of the four GSS variables (since their scales of measurement are not a uniform length) and then calculating the mean of these *z*-scores. So, for each valid case in the GSS data set, a single "religiosity" value was calculated. Unless otherwise stated, all subsequent analyses in the present study rely on this religiosity composite variable.

The number of original religiosity variables used to create the values for the composite variable varies by year, since some surveys from 1972–2012 only include a subset of the four variables. As a result, the religiosity composite variable is most strongly influenced by religious attendance (n = 55,821), followed by strength of affiliation (n = 51,436), prayer frequency (n = 27,816), and biblical fundamentalism (n = 27,618). This may also partially explain why biblical fundamentalism has the least amount of variance accounted for by the one-component solution.

Measure of societal insecurity. One variable from the GSS was used to assess participants' perceptions of societal security. Specifically, participants were asked "Is there any area right around here–that is, within a mile–where you would be afraid to walk alone at night?" and responses were simply "yes" (coded as 1) or "no" (coded as 2). The GSS began asking this question in 1973, but it was not included in 1975, 1978, 1983, and 1986, resulting in 24 years in which data were collected over a 39-year period (valid n = 33,652; 253 cases of "Don't know" or no answer). The data for this "fear" variable were reverse-coded in the present study so as to match the other variables assessing societal insecurity (described below), with higher values indicating a greater degree of insecurity.

Control variables. The following control variables were included in a subset of the present study's analyses because of their relationships with religiosity: sex, race, and age. These relationships were tested in the present study through a series of preliminary analyses (performed using SPSS version 21), which are described below.

Several studies indicate that women are, on average, more religious than men; women express a greater interest in religion (Sasaki, 1979), are more strongly committed to their religions (Bensen, Donahue, & Erickson, 1989), and engage in more frequent religious attendance (Batson, Schoenrade, & Ventis, 1993). These trends are fairly consistent regardless of denomination or type of religious belief system (Stark & Bainbridge, 1985). This relationship is also found in the 1972–2012 GSS data set. An analysis of sex and the religiosity composite variable indicated that women are significantly more religious (M = 0.14, SD = 0.82) than men (M = -0.15, SD = 0.84), $t(56188) = -40.52$, $p < .001$, mean difference = -0.29, 95% CI [-0.30, -0.27], Cohen's d = 0.34.

Although the relationship between race and religiosity has not been examined as extensively as sex and religiosity, researchers have found evidence of significant differences between black and white Americans, with African Americans exhibiting greater degrees of religiosity (see Levin, Taylor, & Chatters, 1994). This relationship was tested in the 1972–2012 GSS data set. A one-way Analysis of Variance indicated a significant difference in religiosity between races, $F(2, 56187) = 437.75$, $p < .001$. However, the effect size is very small, $\eta^2 = 0.02$. Nevertheless, a post-hoc Tukey test indicated that African Americans reported significantly higher religiosity ($M = 0.28$, $SD = 0.77$, 95% CI [0.27, 0.30]) than both White Americans ($M = -0.03$, $SD = 0.85$, 95% CI [-0.04, -0.02]) and others ($M = -0.07$, $SD = 0.81$, 95% CI [-0.10, -0.04]).

Finally, several studies have found a significant relationship between age and religiosity in the United States (Bahr, 1970; Chaves, 1991; Firebaugh & Harley, 1991; Hout & Greeley, 1990), though there is plenty of debate as to what is driving this relationship (see Argue, Johnson, & White, 1999). An analysis of the 1972–2012 GSS data set indicated a significant correlation between age and religiosity, $r(56040) = .18$, $p < .001$. However, as with race, the effect size is quite small, $r^2 = .03$.

Uniform Crime Reports. In addition to the fear variable from the GSS, societal insecurity was assessed by measuring regional crime rates, as the frequency of crime in one's surrounding area arguably influences one's perception of societal insecurity. These crime rates were obtained from *Crime in the United States* (CIUS), an annual report published as part of the Federal Bureau of Investigation's Uniform Crime Report program (UCR; FBI, 2014). Like the variables from the GSS, these data were ideal for the purposes of the current study because of the availability of data over a substantial

time span, as well as the relative consistency of measurement over time. These data are available as far back as 1930, but the present study only used data corresponding to the same time span for which religiosity data from the GSS are available (i.e., 1972–2012).

Data on reported crimes are voluntarily supplied to the FBI annually by over 18,000 law enforcement agencies across the United States. The FBI provides contributing agencies with a handbook that includes instructions on classifying and scoring offenses, as well as definitions of offenses, as these definitions and criteria may vary from state to state. The UCR divides reported crimes into two broad categories: violent crimes and property crimes. Violent crimes are defined in the UCR as offenses involving force or the threat of force, and this category consists of murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault. Property crime comprises burglary, larceny-theft, motor vehicle theft, and arson, specifically when there is no force or threat of force against the victims.

The data reported in the CIUS reflect the Hierarchy Rule, in which only the most serious offense is counted in cases involving multiple offenses. This hierarchy, in descending order, is as follows: murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault, burglary, larceny-theft, and motor vehicle theft. Statistics regarding arson are not included in the UCR's summary data of property crime because of limited participation by local law enforcement agencies, as well a variety of data collection procedures by agencies that do participate. Although the CIUS reports provide data on each type of crime listed above (except arson), the present study relied on data from the broader categories of violent crime and property crime.

In order to control for varying population sizes between states, the current study relied on crime rate data reported in CIUS, rather than the absolute number of crimes reported. For each state and each year, CIUS provides a violent crime rate and property crime rate that is simply the total number of crimes reported in each category divided by the total population. These data are presented as the rate per 100,000 inhabitants.

It is important to note that these data sets to not provide a perfect record of how many crimes are committed, as they are limited to those crimes discovered by or reported to law enforcement agencies. Therefore, one should keep in mind that changes in the values reported over time only partially describe changes in the actual frequency of crimes being committed.

As mentioned earlier, data from the GSS are not broken up by state, but rather by region. Therefore, prior to analysis, state-level data on violent crime and property crime were converted to region-level data by calculating means for the states corresponding to each region (e.g., for each year, violent crime data from New York, New Jersey, and Pennsylvania were converted to a single mean value for the "Middle Atlantic" region). These converted data were then added to the GSS data set.

Current Population Survey. Data regarding the percentage of the U.S. population in poverty, broken up by state and year, were obtained from The Annual Social and Economic Supplement (ASEC; U.S. Census Bureau, 2013) of the Current Population Survey (CPS). The CPS has been conducted monthly for over 50 years and currently includes roughly 54,000 household interviews each month (out of roughly 72,000 housing units assigned for interview). Households are interviewed once a month for four consecutive months one year, and again during the same time period a year later.

The CPS sample is based on the civilian, non-institutionalized population of the United States and consists of 792 sample areas comprising 2,007 independent cities and counties, covering every state and the District of Columbia. Persons 15 years old and over are interviewed, but demographic information for younger individuals is also obtained.

Poverty is calculated based on a series of dollar value thresholds, and these thresholds are determined by family size and the number of children under 18 years old (DeNavas-Walt, Proctor, & Smith, 2013). In order to be categorized as "in poverty," the family's total income (before taxes and tax credits) must be less than the applicable threshold, which is updated annually based on the Consumer Price Index to account for inflation. If the family's total income is below the threshold, then every individual in the family is considered to be in poverty.

The ASEC provides data from 1980 to 2012 on the number of people in poverty in each state and the poverty rate for each state (i.e., the number of poor divided by the state's population). The poverty rate is presented as the rate per 100,000 inhabitants. As with the crime data, the poverty rates were converted to region-level data by calculating mean rates for the states corresponding to each GSS region. These converted data were then added to the GSS data set.

Time Series Data Set. In order to test Hypothesis 3 of the present study, regarding societal insecurity predicting *future* levels of religiosity, a separate data set was created using several of the variables described above. This data set can be viewed in the Appendix (see Table A2). In this data set, each "case" was a year, resulting in 41 cases representing the years 1972–2012. Violent crime rate, property crime rate, and poverty rate data were added to the data set by calculating the mean of the state values for each

year. The neighborhood fear variable from the GSS was also added to this data set by calculating the mean responses for each year in the 1972–2012 GSS data set. Finally, the religiosity composite variable was added to this data set by calculating the mean values for each year in the 1972–2012 GSS data set.

Given the already limited number of cases available in this data set for time series analysis, the fact that there are several years in which the GSS has not been administered is a considerable problem. Therefore, missing values of neighborhood fear and religiosity in the time series data set were replaced by calculating the median of the nearest value above and below the missing value. For example, a religiosity value of 0.0457 was created for the year 1992 by calculating the median of the existing values from 1991 and 1993. This method of missing value replacement was chosen based on the assumption that values for these variables are unlikely to change drastically in the short term, from year to year, and therefore the missing value for any given year can be reasonably estimated as falling in between the values of neighboring years.

III. RESULTS

Religiosity and Individual Perceptions of Societal Insecurity

To test Hypothesis 1, that individuals' perceptions of societal insecurity are positively related to their reported religiosity, an independent samples *t*-test was conducted (using SPSS 21) to determine the effect of neighborhood fear (i.e., one's fear of going outside at night in their neighborhood) on the religiosity composite variable. This analysis was conducted to take advantage of the greatest number of cases in the GSS data set, as the subsequent regression analyses described below, which use several variables, are limited by the number of cases with valid data for all variables. The *t*-test was significant, $t(33554) = -15.57$, $p < .001$, mean difference = -.15, 95% CI [-.16, -.13], Cohen's $d = .17$ (see Figure 2). Participants who indicated that they are afraid to walk around their neighborhood at night had higher religiosity scores ($M = 0.09$, $SD = 0.83$) than those who were not afraid ($M = -0.05$, $SD = 0.83$). In other words, as predicted, higher perceptions of societal insecurity are related to higher levels of religiosity.

To further test Hypothesis 1, a series of chi-square tests of independence was conducted using SPSS version 21 to see if this relationship between the religiosity composite variable and fear would hold true for each of the four original religiosity variables from the GSS (religious attendance, prayer frequency, biblical fundamentalism, and strength of affiliation). The results of these tests are summarized in Figures 3–6.

To facilitate the analysis of religious attendance and interpretation of the chi-square test results, the attendance categories "never," "less than once a year," and "about

once or twice a year" were collapsed into a "low attendance" category, and the categories "nearly every week," "every week," and "several times a week" were collapsed into a "high attendance" category. Other categories of attendance were not included in the chi-square test, as they arguably represent "moderate" levels of religiosity (but see Appendix Figure A1 for chi-square test results using all original categories).

It is important to emphasize that the chi-square test determines the relationship between the two variables by comparing observed and expected frequencies in each cell (the combinations of categories from each variable), as the absolute frequencies may provide a distorted view of the relationship. For example, there were more unafraid participants belonging to the "high attendance" category than afraid participants (*N*s = 6,441 and 4,747, respectively), which seemingly runs counter to what the Secure Society Theory would predict. However, this is because there were more participants overall in the GSS data set reporting they were unafraid rather than afraid (*N*s = 20,479 and 13,173, respectively). Therefore, even if insecurity and religiosity were unrelated, we would still expect to see more unafraid participants in the high religiosity category. The chi-square test of independence takes this into account when calculating the expected frequencies for each cell, thereby controlling for differences in the frequencies of the original categories.

The chi-square test of independence for religious attendance was significant, $X^2(1, N = 23{,}681) = 101.51$, $p < .001$ (see Figure 3). However, the effect size, as measured by Cramer's V (φ_c), was quite small, $\varphi_c = .07$. Cramer's V was calculated using the following formula: $\varphi_c = [X^2/N(k\text{-}1)]^{1/2}$, where *k* refers to the levels of the variable with the fewest categories. Those who indicated that they *are* afraid to walk around their neighborhood at night were significantly more likely than expected to exhibit high levels

of religious attendance (O = 4,747, E = 4,350; std. residual = 5.7), and they were significantly less likely than expected to exhibit low levels of religious attendance (O = 4,496, E = 4,873; std. residual = -5.4). Those who indicated that they are *not* afraid were significantly more likely than expected to exhibit low levels of religious attendance (O = 8,017, E = 7,640; std. residual = 4.3), and they were significantly less likely than expected to exhibit high levels of religious attendance (O = 6,441, E = 6,818; std. residual = -4.6). In short, security and religiosity are not independent of each other, and as predicted, higher perceptions of societal insecurity are related to higher levels of religious attendance, and vice versa.

To facilitate the analysis of prayer frequency and interpretation of the chi-square test results, the categories of "never," "less than once a week," and "once a week" were collapsed into a "low prayer frequency" category, and the categories of "several times a week," "once a day," and "several times a day" were collapsed into a "high prayer frequency" category (but see Appendix Figure A2 for chi-square test results using all original categories).

The chi-square test of independence for prayer frequency was significant, $X^2(1, N = 17{,}835) = 157.58$, $p < .001$ (see Figure 4). Again, the effect size was small, $\varphi_c = .09$. Those who indicated that they *are* afraid to walk around their neighborhood at night were significantly more likely than expected to exhibit high prayer frequency (O = 4,939, E = 4,567; std. residual = 5.5), and they were significantly less likely than expected to exhibit low prayer frequency (O = 1,626, E = 1,998; std. residual = -8.3). Those who indicated that they are *not* afraid were significantly more likely than expected to exhibit low prayer frequency (O = 3,802, E = 3,430; std. residual = 6.4), and they were significantly less

likely than expected to exhibit high prayer frequency (O = 7,468, E = 7,840; std. residual = -4.2). In short, as predicted, higher perceptions of societal insecurity are related to higher prayer frequency, and vice versa.

Regarding biblical fundamentalism, it wasn't necessary to collapse any categories since there were three to begin with: belief that the Bible is (1) the literal word of God, (2) the inspired word of God, or (3) a book of fables. The chi-square test of independence for biblical fundamentalism was significant, $X^2(2, N = 17{,}550) = 78.89$, $p < .001$ (see Figure 5). The effect size was small, $\varphi_c = .07$. Those who indicated that they *are* afraid to walk around their neighborhood at night were significantly more likely than expected to view the Bible as the literal word of God (O = 2,462, E = 2,204; std. residual = 5.5) and significantly less likely than expected to view the Bible as a book of fables (O = 972, E = 1,095; std. residual = -3.7). Those who indicated that they are *not* afraid to walk around their neighborhood at night were significantly more likely than expected to view the Bible as a book of fables (O = 1,975, E = 1,852; std. residual = 2.9) and significantly less likely than expected to view the Bible as the literal word of God (O = 3,469, E = 3,727; std, residual = -4.2). The "inspired word of God" category showed a significant difference for the "afraid" group, but no significant difference for the "unafraid" group. It is difficult to interpret the effects for this category since it arguably represents a moderate level of religiosity, but for the less ambiguous categories, as predicted, higher perceptions of societal insecurity are related to greater biblical fundamentalism, and vice versa.

To facilitate the analysis of strength of religious affiliation, the categories of "no religion" and "not very strong" were collapsed into a "low strength" category, and the "strong" category was unchanged and used as the "high strength" category. The

"somewhat strong" category was not included in this analysis, as it represents a vague, volunteered response, and few participants belong to this category in the first place (but see Appendix Figure A3 for chi-square test results using all original categories)

The chi-square test of independence for strength of affiliation was significant, $X^2(1, N = 27{,}787) = 155.66$, $p < .001$ (see Figure 6). The effect size was small, $\varphi_c = .07$. Those who indicated that they *are* afraid to walk around their neighborhood at night were significantly more likely than expected to exhibit strong religious affiliations (O = 5,110, E = 4,608; std. residual = 7.4), and they were significantly less likely than expected to exhibit weak religious affiliations (O = 5,766, E = 6,268; std. residual = -6.3). Those who indicated that they were *not* afraid were significantly more likely than expected to exhibit weak religious affiliations (O = 10,247, E = 9,745; std. residual = 5.1) and significantly less likely than expected to exhibit strong religious affiliations (O = 6,664, E = 7,166; std. residual = -5.9). In short, as predicted, higher perceptions of societal insecurity are related to stronger religious affiliations, and vice versa.

Does Societal Insecurity, at the Individual and Regional Level, Predict Religiosity?

To test Hypothesis 2, that both individual perceptions of societal insecurity and regional factors indicative of societal insecurity can positively predict levels of religiosity, multiple linear regression analyses were conducted using SPSS 21. Two regression models were run to determine whether regional societal insecurity as measured by violent crime rate, property crime rate, and poverty rate, along with individual perceptions of societal insecurity as measured by the GSS fear variable, predict religiosity when controlling for age, sex, and race (dummy coded with "black" and "other" entered into the model, and "white" omitted to serve as the reference category).

Two models were run to avoid issues of multicollinearity because of the strong correlation between violent crime rate and property crime rate, $r(27526) = .58$, $p < .001$. See Table 5 for a summary of descriptive statistics and the intercorrelations between all variables used in these regression analyses.

The results of Model 1, which excluded property crime rate, are summarized in Table 6. The variables were entered into the model in two blocks: The first block (the partial model) included the control variables, and the second block (the full model) introduced the societal insecurity variables. This allowed for determining whether the inclusion of the societal insecurity variables significantly contributed to the model fit. The partial model significantly predicted and explained roughly 8% of the variance in religiosity, adjusted $R^2 = .081$, $SE = 0.79$, $F(4, 27523) = 607.66$, $p < .001$. All of the control variables significantly contributed to the model, and their coefficients were all positive, which is consistent with the previous literature and preliminary analyses described in the Method section. The standardized coefficients (β), which allow one to directly compare the predictive power of variables measured in different units, indicated that age was the strongest predictor ($\beta = 0.185$, $p < .001$). In other words, for every increase of one standard deviation in age, religiosity is predicted to increase by 0.185 standard deviations. The next strongest predictor was sex ($\beta = 0.168$, $p < .001$), followed by the black racial category ($\beta = 0.133$, $p < .001$), and, finally, the "other" racial category ($\beta = 0.012$, $p = .046$).

The full model was also significant and explained roughly 10% of the variance in religiosity, adjusted $R^2 = .097$, $SE = 0.78$, $F(7, 27520) = 425.57$, $p < .001$. Using a criterion of VIF values less than 10, there were no apparent issues of multicollinearity in

the full model, as all VIFs were less than 1.2. The change in explained variance was significant, $\Delta R^2 = .017$, $\Delta F(3, 27520) = 168.04$, $p < .001$, indicating that the collection of societal insecurity variables significantly contributed to the model beyond the control variables. The control variables all remained significant predictors in the full model, and although their coefficients changed slightly, their relative strengths as predictors remained the same. Aside from the "other" racial category ($\beta = .016$, $p = .005$), all of the control variables were stronger predictors of religiosity than the societal insecurity variables. Among the societal insecurity variables, poverty rate was the strongest predictor ($\beta = 0.119$, $p < .001$), followed by violent crime rate ($\beta = 0.027$, $p < .001$) and neighborhood fear ($\beta = 0.013$, $p = .027$). As predicted, all of the coefficients for the societal insecurity variables were positive, indicating that as both individual perceptions of societal insecurity and regional factors indicative of societal insecurity increase, religiosity increases.

The results of Model 2, which excluded violent crime rate, are summarized in Table 7. The variables were again entered into the model in two blocks, following the same procedure as Model 1. As block 1 was identical to that of Model 1, the results of the partial model were identical and will not be repeated here. The full model was significant and, like Model 1, explained roughly 10% of the variance in religiosity, adjusted $R^2 = .098$, $SE = 0.78$, $F(7, 27520) = 425.96$, $p < .001$. Using a criterion of VIF values less than 10, there were no apparent issues of multicollinearity in the full model, as all VIFs were less than 1.2. The change in explained variance was significant, $\Delta R^2 = .017$, $\Delta F(3, 27520) = 168.67$, $p < .001$, indicating that the collection of societal insecurity variables significantly contributed to the model beyond the control variables. The control variables

all remained significant predictors in the full model, and although their coefficients changed slightly, their relative strengths as predictors remained the same. Aside from the "other" racial category ($\beta = 0.017$, $p = .003$), all of the control variables were stronger predictors of religiosity than the societal insecurity variables. Among the societal insecurity variables, poverty rate was again the strongest predictor ($\beta = 0.122$, $p < .001$), followed by property crime rate ($\beta = 0.028$, $p < .001$) and neighborhood fear ($\beta = 0.013$, $p = .035$). As predicted, all of the coefficients for the societal insecurity variables were positive, again indicating that as both individual perceptions of societal insecurity and regional factors indicative of societal insecurity increase, religiosity increases.

Does Societal Insecurity Predict Future Religiosity?

To test Hypothesis 3, that both perceptions of societal insecurity and factors indicative of societal insecurity can predict *future* levels of religiosity at the national level, a time series analysis was conducted. More specifically, this hypothesis was tested through the use of vector autoregression (VAR; Sims, 1980)—following the methodology of Solt et al. (2011)—and the statistical software program STATA version 12.1.

The VAR equation is similar to that used in multiple linear regression. However, the VAR model actually consists of *n* equations, where *n* is the number of variables being investigated (Stock & Watson, 2001). In each equation, one of the variables takes a turn as the criterion and is predicted by lagged values of itself, all other variables, and a serially uncorrelated error term. Each equation is then estimated by Ordinary Least Squares (OLS) regression. This is referred to as a standard, "reduced form" VAR, which is the type of VAR used in the present study.

For these analyses, violent crime rate and property crime rate were combined into a "total crime rate" variable to avoid issues of multicollinearity, as running separate models with each type of crime is less feasible in this case because of the number of equations involved in a single model. The total crime rate variable was created by first standardizing the violent crime and property crime data in the time series data set into *z*-scores. The total crime variable was then computed as the mean of the two standardized variables.

Model selection criteria are used to determine the best lag length for the VAR model. The most common criteria used are the Akaike (AIC), Schwarz-Bayesian (BIC), and Hannan-Quinn (HQ) (Zivot & Wang, 2003). These criteria are produced in STATA after specifying the variables to be included in the VAR and inputting a set number of potential lags. The recommended procedure is to choose the lag for which the selection criteria values are minimized (Lütkepohl, 2005). For the present study, although a lag of 8 years was found to best minimize the selection criteria (AIC = 3.55, HQIC = 3.82, SBIC = 4.52), this model failed to pass the Lagrange multiplier (LM) test for autocorrelation, $X^2(16, N = 25) = 36.28$, $p = .003$. Despite collapsing violent and property crime into a single variable, there was still an issue of multicollinearity. The LM test output indicated that a lag of 10 years should be chosen. Although the selection criteria values were slightly larger (AIC = 3.99, HQIC = 4.24, SBIC = 4.98), this model passed the LM test, $X^2(16, N = 23) = 17.82$, $p = .33$.

As mentioned earlier, these analyses relied on a separate time series data set, with 41 cases representing the years 1972-2012. However, with a lag of 10 years and poverty data only going back to 1980, the VAR model was limited to analyzing 23 cases, from

1990–2012. The variables entered into the VAR equations were total crime rate, poverty rate, neighborhood fear, and the religiosity composite. In this data set, these variables reflect values at the national level, as the values are means of state- or region-level data for each year. The VAR model can be illustrated as follows:

$$\begin{aligned}
\text{Religiosity}_t &= a_{10} + a_{11}\text{Religiosity}_{t-10} + a_{12}\text{TotalCrime}_{t-10} + a_{13}\text{Poverty}_{t-10} + a_{14}\text{Fear}_{t-10} + e_{1t} \\
\text{TotalCrime}_t &= a_{20} + a_{21}\text{Religiosity}_{t-10} + a_{22}\text{TotalCrime}_{t-10} + a_{23}\text{Poverty}_{t-10} + a_{24}\text{Fear}_{t-10} + e_{2t} \\
\text{Poverty}_t &= a_{30} + a_{31}\text{Religiosity}_{t-10} + a_{32}\text{TotalCrime}_{t-10} + a_{33}\text{Poverty}_{t-10} + a_{34}\text{Fear}_{t-10} + e_{3t} \\
\text{Fear}_t &= a_{40} + a_{41}\text{Religiosity}_{t-10} + a_{42}\text{TotalCrime}_{t-10} + a_{43}\text{Poverty}_{t-10} + a_{44}\text{Fear}_{t-10} + e_{4t}
\end{aligned} \quad (1)$$

Since STATA does not provide standardized coefficients as part of the output for VAR analyses, prior to running the VAR model, the poverty rate, fear, and religiosity variables were transformed into *z*-scores. Thus, the unstandardized coefficients provided by STATA can be interpreted in the same way as standardized coefficients (i.e., how many *SD*s the criterion changes for every 1 *SD* change in the predictor). The total crime rate variable was not transformed as it already represents the mean values of two standardized variables, and thus approximates a standardized variable itself ($M = 0.00$, $SD = 0.97$).

The results of the VAR model are summarized in Table 8. All four equations were significant predictors of their respective criteria, explaining 76% of the variance in religiosity, 73% of the variance in total crime, 72% of the variance in poverty rate, and 55% of the variance in neighborhood fear (all *p*s < .001). The primary portion of the model to consider for the present study is the equation for predicting religiosity. For this

equation, the strongest predictor was neighborhood fear ($\beta = 0.46$, $p = .003$), followed by poverty rate ($\beta = 0.30$, $p = .03$). Both coefficients were positive, indicating that, as predicted, increases in fear and poverty predict an increase in future religiosity (specifically, religiosity 10 years later). However, counter to expectations, total crime rate did not significantly predict future religiosity. Thus, the results only provide partial support for Hypothesis 3.

It is also worth noting from the other equations that religiosity is a significant predictor of future increases in crime ($\beta = 0.58$, $p = .001$) and future increases in neighborhood fear ($\beta = 0.89$, $p = .003$). These results were not hypothesized, yet they suggest the possibility of a feedback loop between religiosity and societal security, which is considered in more detail in the Discussion section.

IV. DISCUSSION

The present study tested three hypotheses derived from Norris and Inglehart's (2004) Secure Society Theory (SST) of religiosity, with the goal of explaining variations in religiosity within the United States at both the individual and societal level. To summarize, SST states that as societies become more secure (i.e., as citizens are exposed to fewer risks and dangers, and survival can be taken for granted), those societies will also become less religious, because people will feel less of a need for religious reassurance. In other words, SST predicts a negative relationship between societal security and religiosity. Another way of putting this is that SST predicts a positive relationship between societal *insecurity* and religiosity. This is how the relationship was framed in the present study, due to the types of variables that were analyzed. Thus, the present study hypothesized that (1) individual perceptions of societal insecurity would be positively related to reported religiosity, (2) both individual perceptions of, and regional factors indicative of, societal insecurity would positively predict religiosity, and (3) at the national level, societal insecurity would positively predict future religiosity.

Hypothesis 1 was fully supported by the analyses in the present study. Individual perceptions of societal insecurity, as measured by reporting whether one was afraid to walk around their neighborhood at night, were positively related to religiosity. Individuals who reported that they were afraid were significantly more religious than those reporting they were not afraid, as indicated by a religiosity composite score

comprising religious attendance, prayer frequency, biblical fundamentalism, and strength of religious affiliation. This relationship held true when examining each religiosity measure separately. Hypothesis 2 was also fully supported, providing further evidence for the positive relationship between societal insecurity and religiosity. Neighborhood fear, violent crime rate, property crime rate, and poverty rate all significantly predicted religiosity, even when controlling for the effects of each other and the control variables of sex, age, and race.

Hypothesis 3 was partially supported, in that neighborhood fear and poverty rate (but not crime rate) predicted levels of religiosity 10 years later. As with the previous analyses, there was a positive relationship, indicating that increases in societal insecurity predict increases in future religiosity. Interestingly, religiosity was also positively related to future crime rate and neighborhood fear. These results were not predicted by SST, and it is unclear why increased religiosity would lead to increases in actual societal insecurity (i.e., higher crime rates). However, the relationship between religiosity and perceived societal insecurity (i.e., neighborhood fear) is more readily interpretable as indicative of a feedback loop, in which religiosity is both influenced by perceptions of insecurity and influences those perceptions. In other words, it may be the case that not only are people who perceive greater societal insecurity likely to be more religious, but people who are more religious are likely to perceive greater insecurity.

Given the overall support found for the hypotheses outlined in the present study, what conclusions can be reached regarding the relationship between societal insecurity and religiosity? Overall, the apparent relationship is consistent with the Secure Society Theory. Perceptions of insecurity, whether assessed directly (through neighborhood fear)

or indirectly (through regional crime rates and poverty rates, which are likely to influence the perceptions of people living in those regions), are positively related to religiosity: The less secure one perceives society to be, the more religious they are, now and 10 years later.

However, the present results do not allow one to make strong inferences regarding causality. The chi-square tests of independence indicated that religiosity and perceptions of societal insecurity are not independent of each other, but this does not mean that any causal relationship necessarily exists. Likewise, the multiple regression analyses concluded that societal insecurity variables uniquely predict religiosity, but their predictive power is merely an indication of the relationship between the variables, not an indication that the predictors *cause* changes in religiosity. The time series analysis provides the strongest evidence for causality in the present study by showing that some aspects of insecurity predict future levels of religiosity, but technically the results only indicate that the variables are related, as with the other multiple regression analyses performed earlier.

From an evolutionary perspective, the present study's results indicate that the mechanisms (or a subset of the mechanisms) associated with religious beliefs and behaviors are sensitive to environmental input regarding societal insecurity, and these mechanisms respond to increased insecurity by strengthening religiosity. This is in line with Norris and Inglehart's (2004) proposed function of religion as a coping mechanism in the face of societal insecurity. However, this does not necessarily support the idea that religion is an adaptation. A possible alternative explanation is that there are mechanisms that cope with unpredictable and unsafe environments by increasing one's perception of

control, as this may serve as a buffer against helplessness or negative affect (Case, Fitness, Cairns, & Stevenson, 2004). This may occur regardless of the existence of religious beliefs; indeed, experimental manipulations of perceived control have been found to elicit increased superstitious behavior (Keinan, 2002) and illusory pattern perception (Whitson & Galinsky, 2008). However, given the existence of religious beliefs, particularly beliefs that provide meaning for events or circumstances that may otherwise seem unpredictable, religion in this context may be best viewed as an "exaptation," serving as a form of compensatory control (Kay et al., 2010) even though religious beliefs and behaviors were not necessarily originally selected for this purpose.

This interpretation inevitably leads to the question: Why would the *illusory* perception of increased control be adaptive? Norris and Inglehart (2004) suggest that perceptions of control are useful in unpredictable and unsafe environments because "Individuals experiencing stress have a need for rigid, predictable rules. They need to be sure of what is going to happen because they are in danger—their margin for error is slender and they need maximum predictability" (p. 19). This does not explain what is going on, though, because the superstitions, perceptions of illusory patterns, and religious beliefs do not provide "maximum predictability." They provide the illusion of increased control without *actually* increasing one's control over events. If one's margin for error is slender, it seems maladaptive to invent meaning behind events just to reduce negative affect. After all, evolution does not care how happy or sad you are, and these feelings are only useful by the extent to which they motivate adaptive behaviors.

When dealing with threats in the natural environment, the most accurate interpretation of one's control would be most adaptive, as this would allow one to

allocate their resources appropriately. However, Kurzban (2010) offers an interesting evolutionary explanation for the phenomena described above, which are examples of what he calls "strategic ignorance." The key to explaining why inaccurate information may sometimes be adaptive is the fact that humans deal with more than just the natural environment: We are an extremely social species, and we have spent much of our evolutionary history living in small groups that depended on each other for survival. It is important that others view you as being a valuable member of the group; therefore, it is adaptive to persuade others that you are more valuable than you actually are. Rather than consciously lying, an effective method of persuasion is to actually believe the inaccurate information yourself. Although this explanation is speculative, there are a variety of phenomena that it can potentially explain (see Kurzban, 2010), including the illusory perception of control in unpredictable and unsafe environments.

Limitations of the Present Study

Although it is not technically a *limitation* of the present study, this section begins with addressing the small effect sizes obtained from the tests of Hypotheses 1 and 2, because these small effects may be partially explained by some of the limitations of this study. For example, one of the weaknesses of using archival data is that the data were collected without the present study's hypotheses in mind. As a result, the variables used in the present study regarding societal insecurity were not ideal. The question assessing insecurity in the GSS (neighborhood fear) was very specific and, arguably, only taps into a small portion of one's overall perception of societal insecurity. Therefore, the effect of neighborhood fear on religiosity should not be misconstrued as the effect of *overall* perceptions of societal insecurity on religiosity. More comprehensive measures of

perceived societal insecurity would provide a much clearer picture of how this perception is related to religiosity, and would possibly result in a larger effect size.

Another limitation that may have reduced the effect sizes is the lack of state-level data from the GSS. Since the GSS participants were only identified as belonging to one of nine regions, the state-level data on crime and poverty rates obtained elsewhere had to be converted to the same nine regions for analysis. To the extent that crime and poverty affect one's perceptions of insecurity, it is likely that the effect weakens the further away the crime and poverty are from the individual. Since some of the GSS regions contain as many as eight states, one should expect the crime and poverty data to only partially represent one's perception of insecurity in their local environment. It is therefore encouraging that, despite this lack of precision, the insecurity variables in the present study were all significantly related to religiosity in the predicted direction, and it is likely that data more specific to one's local environment would produce a larger effect size.

Although the effect sizes regarding the time series analysis were larger, there was a significant limitation to this portion of the study as well: namely, the restricted number of observations. Although the data used in the present study span several decades, the time lag of 10 years used in the vector autoregression model resulted in 23 observations. Therefore, the analyses should be interpreted with caution, as they may not accurately describe the relationship between religiosity and insecurity over time. The results were promising in that they were, for the most part, in the predicted direction, but studies analyzing this relationship over a longer period of time are necessary before making any strong conclusions.

Directions for Future Studies

The results of the present study support the idea that perceptions of societal insecurity influence religiosity, which serves as a useful foundation for future studies to investigate the possible causal nature of this relationship. Several possibilities for building upon the present results are described below.

As mentioned earlier, the present study relied on measures that arguably tap into one's perception of societal insecurity. Clearly, an important next step for future studies would be to develop a more direct measure of this perception. By constructing a scale that is specifically focused on measuring one's perceptions of societal insecurity, researchers could assess the relationship between these perceptions and one's religiosity more accurately. Additionally, assuming such a scale is constructed and validated, researchers could design experiments to test whether these perceptions *cause* changes in religiosity. For example, researchers could prime participants to have an increased perception of insecurity, perhaps by exposing them to either real or fabricated news stories regarding crime in their local environment. The effectiveness of the prime could be assessed by assessing differences between groups on the societal insecurity scale, and researchers could then investigate whether such primes lead to an increase in reported religiosity relative to participants who are primed to have a decreased perception of insecurity.

Similarly, given the possible feedback loop between religiosity and perceptions of insecurity suggested by the time series analysis results, researchers could prime participants' religiosity and subsequently have them complete the societal insecurity scale. This would allow one to test for causality in the opposite direction—i.e., to test for

an increase in perceived insecurity relative to participants who are not primed with religious ideas/concepts.

Finally, future studies can investigate the possible adaptive function of increased religiosity as a result of increased societal insecurity. Assuming an effect on religiosity is found when priming societal insecurity, one could investigate whether this effect is strengthened in a group setting. If Kurzban's (2010) argument regarding strategic ignorance applies to this phenomenon (i.e., increased religiosity leads to increased perceptions of control, which makes one appear more valuable to the group), one could hypothesize that the presence of others may strengthen this effect. This line of reasoning could also be extended to investigating effects in the context of cooperative/competitive games; perhaps people are more willing to cooperate with individuals who react more strongly with compensatory control in the face of insecurity.

Conclusion

The present study found evidence consistent with the Secure Society Theory of religiosity. There appears to be a relationship between societal insecurity and religiosity in the United States over the last 40 years. Although the nature of this relationship is still unclear, the present study builds upon previous research by illustrating that this relationship is not driven solely by societal conditions, but by individuals' *perceptions* of societal insecurity. Given the number of studies that now reliably demonstrate a relationship between societal indicators of insecurity and religiosity, it is important to move forward by more directly assessing perceptions of societal insecurity at the individual level. The present study serves as a useful foundation for moving research forward in this way. Although religiosity is clearly influenced by a variety of factors,

further investigation of perceptions of societal insecurity may provide key insights regarding variations in religiosity at the individual and societal level.

Table 1.

Religiosity by Type of Society

	Agrarian	Industrial	Post-Industrial	Eta	Sig.
Religious Participation					
Attend church at least weekly	44	25	20	.171	**
Pray "every day"	52	34	26	.255	***
Religious Values					
Religion "very important"	64	34	20	.386	***
Religious Beliefs					
Belief in life after death	55	44	49	.229	*
Believe that people have a soul	68	43	32	.169	***
Believe in heaven	63	45	44	.094	*
Believe in hell	59	36	26	.228	***
Believe in God	78	72	69	.016	n/s

Note. * $p < .05$; ** $p < .01$*** $p < .001$; n/s = not significant; The significance of the difference between group means is measured by ANOVA (Eta).
Source: Norris & Inglehart, 2004 (p. 57)

Table 2.

Summary of Religiosity and Societal Insecurity Variables Used in the Present Study

Religiosity Variables	Description	Years covered	Source
Religious Attendance	How often participants attend religious services, on a scale of 0 (never) to 8 (more than once a week)	1972-1978, 1980, 1982-1991, 1993-1994, 1996, 1998, 2000, 2002, 2004, 2008, 2010, 2012	NORC: GSS
Prayer Frequency	How often participants pray, on a scale of 1 (never) to 6 (several times a day)	1983-1985, 1987-1990, 1993-1994, 1996, 1998, 2000, 2002, 2004, 2008, 2010, 2012	NORC: GSS
Biblical Fundamentalism	Feelings toward the Bible, on a scale of 1 (book of fables) to 3 (literal word of God)	1984-1985, 1987-1991, 1993-1994, 1996, 1998, 2000, 2002, 2004, 2008, 2010, 2012	NORC: GSS
Strength of Affiliation	How strongly affiliated participants are to their religion, on a scale of 1 (no religion) to 4 (strong affiliation)	1974-1978, 1980, 1982-1991, 1993-1994, 1996, 1998, 2000, 2002, 2004, 2008, 2010, 2012	NORC: GSS
Religiosity	Single religiosity variable consisting of the means of the standardized (*z* score) versions of the four GSS religiosity variables	1972-1978, 1980, 1982-1991, 1993-1994, 1996, 1998, 2000, 2002, 2004, 2008, 2010, 2012	-
Societal Insecurity Variables			
Neighborhood Fear	Whether participants are afraid to walk around their neighborhood at night (either yes or no)	1973-1974, 1976-1977, 1979-1980, 1982, 1984-1985, 1987-1991, 1993-1994, 1996, 1998, 2000, 2002, 2004, 2008, 2010, 2012	NORC: GSS
Violent Crime Rate	The rate of violent crimes per 100,000 inhabitants	1972-2012	FBI: CIUS
Property Crime Rate	The rate of property crimes per 100,000 inhabitants	1972-2012	FBI: CIUS
Poverty Rate	The rate of poverty (living below the poverty threshold) per 100,000 inhabitants	1980-2012	US Census: ASEC

Note. NORC = National Opinion Research Center; GSS = General Social Survey; FBI = Federal Bureau of Investigation; CIUS = Crime in the United States report; ASEC = The Annual Social and Economic Supplement report

Table 3.

Summary of Religious Affiliations Indicated in the 1972-2012 General Social Survey

Religious Affiliation	*N*
Protestant	32,289
Catholic	14,533
Jewish	1,111
None	5,994
Buddhism	136
Hinduism	73
Other Eastern	32
Moselm/Islam	135
Orthodox-Christian	110
Christian	579
Native American	24
Inter-nondenominational	117
Other	983

Table 4.

Pearson Correlations between Religious Attendance, Prayer Frequency, Biblical Fundamentalism, and Strength of Religious Affiliation

	Attendance	Prayer Freq.	Fundamentalism	Strength of Affil.
Attendance	-			
Prayer Freq.	.53 (N = 27,616)	-		
Fundamentalism	.37 (N = 27,362)	.42 (N = 23,742)	-	
Strength of Affil.	.64 (N = 51,164)	.51 (N = 26,912)	.38 (N = 26,590)	-

Note. All *r*s significant at $p < .001$. Source: 1970-2012 General Social Survey

Table 5.

Summary of Intercorrelations and Descriptive Statistics for the Criterion (Religiosity), Predictors, and Control Variables (Age, Sex, Race) Used in Multiple Linear Regression Analyses

	Relig	Age	Sex	Black	Other	Viol	Prop	Pov	Fear
Relig	-								
Age	.18***	-							
Sex	.18***	.03***	-						
Black	.13***	-.04***	.04***	-					
Other	-.02***	-.11***	-.02***	-.10***	-				
Viol	.06***	-.02**	.001	.10***	-.03***	-			
Prop	.03***	-.06***	.002	-.02***	-.03***	.58***	-		
Pov	.14***	-.01	.01	.08***	-.05***	.23***	.13***	-	
Fear	.09***	.04***	.31***	.08***	.02***	.09***	.09***	.03***	-
M	-0.0068	44.46	1.54	0.12	0.06	524.25	4122.29	13.21	1.38
SD	0.8207	17.05	0.50	0.33	0.25	157.04	919.03	2.72	0.49

Note. N = 27,528. Relig = religiosity composite variable. Other = race category of "other." Viol = violent crime rate. Prop = property crime rate. Pov = poverty rate. Fear = response to GSS neighborhood fear item.
** $p < .01$; *** $p < .001$

Table 6.

Summary of Results from Multiple Linear Regression Model 1 (Excluding Property Crime Rate) Predicting Religiosity

	Religiosity (Criterion)			
	Block 1	Block 2		
Predictors	B	B	95% CI	β
Age	0.009***	0.009***	[0.008, 0.010]	0.186
Sex	0.277***	0.270***	[0.250, 0.289]	0.164
Race (Black)	0.335***	0.303***	[0.274, 0.231]	0.120
Race (Other)	0.039*	0.055**	[0.017, 0.093]	0.016
Violent Crime Rate		0.0001***	[0.00008, 0.00020]	0.027
Poverty Rate		0.036***	[0.032, 0.039]	0.119
Neighborhood Fear		0.023*	[0.003, 0.043]	0.013
R^2	.081		.097	
F	607.66***		425.57***	
ΔR^2			.017	
ΔF			168.04***	

Note. N = 27,528. B = unstandardized coefficient. β = standardized coefficient. R^2 = adjusted R^2.
* $p < .05$. ** $p < .01$. *** $p < .001$. Significance level of Block 2 B values applies to β values.

Table 7.

Summary of Results from Multiple Linear Regression Model 2 (Excluding Violent Crime Rate) Predicting Religiosity

	Religiosity (Criterion)			
	Block 1	Block 2		
Predictors	B	B	95% CI	β
Age	0.009***	0.009***	[0.008, 0.010]	0.188
Sex	0.277***	0.270***	[0.250, 0.289]	0.164
Race (Black)	0.335***	0.311***	[0.282, 0.339]	0.124
Race (Other)	0.039*	0.057**	[0.019, 0.095]	0.017
Property Crime Rate		0.00002462***	[0.000014, 0.000035]	0.028
Poverty Rate		0.037***	[0.033, 0.040]	0.122
Neighborhood Fear		0.022*	[0.002, 0.042]	0.013
R^2	.081		.098	
F	607.66***		425.96***	
ΔR^2			.017	
ΔF			168.87***	

Note. N = 27,528. B = unstandardized coefficient. β = standardized coefficient. R^2 = adjusted R^2.
* $p < .05$. ** $p < .01$. *** $p < .001$. Significance level of Block 2 B values apply to β values.

Table 8.

Summary of Vector Autoregression Results, Predicting Religiosity, Total Crime Rate, Poverty Rate, and Neighborhood Fear as a Function of Themselves and Every Other Variable, Each with a Lag of 10 Years

	Criterion							
	Religiosity		Total Crime Rate		Poverty Rate		Neighborhood Fear	
Predictors	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Relig L10	0.19	[-0.12, 0.50]	0.58**	[0.25, 0.91]	0.38	[-0.06, 0.81]	0.89**	[0.29, 1.49]
Crime L10	-0.17	[-0.60, 0.26]	-0.49*	[-0.95, -0.03]	-2.25***	[-2.85, -1.64]	-.82	[-1.65, 0.02]
Pov L10	0.30*	[0.03, 0.58]	0.27	[-0.03, 0.56]	0.20	[-0.18, 0.59]	0.34	[-0.20, 0.87]
Fear L10	0.46***	[0.16, 0.76]	0.23	[-0.09, 0.55]	0.22	[-0.20, 0.64]	-0.15	[-0.73, 0.43]
R^2	.76***		.73***		.72***		.55***	

Note. $N = 23$. L10 = lag of 10 years. Values of β are technically unstandardized coefficients, but can be treated as standardized since they were derived from standardized variables.
* $p < .05$. ** $p < .01$. *** $p < .001$.

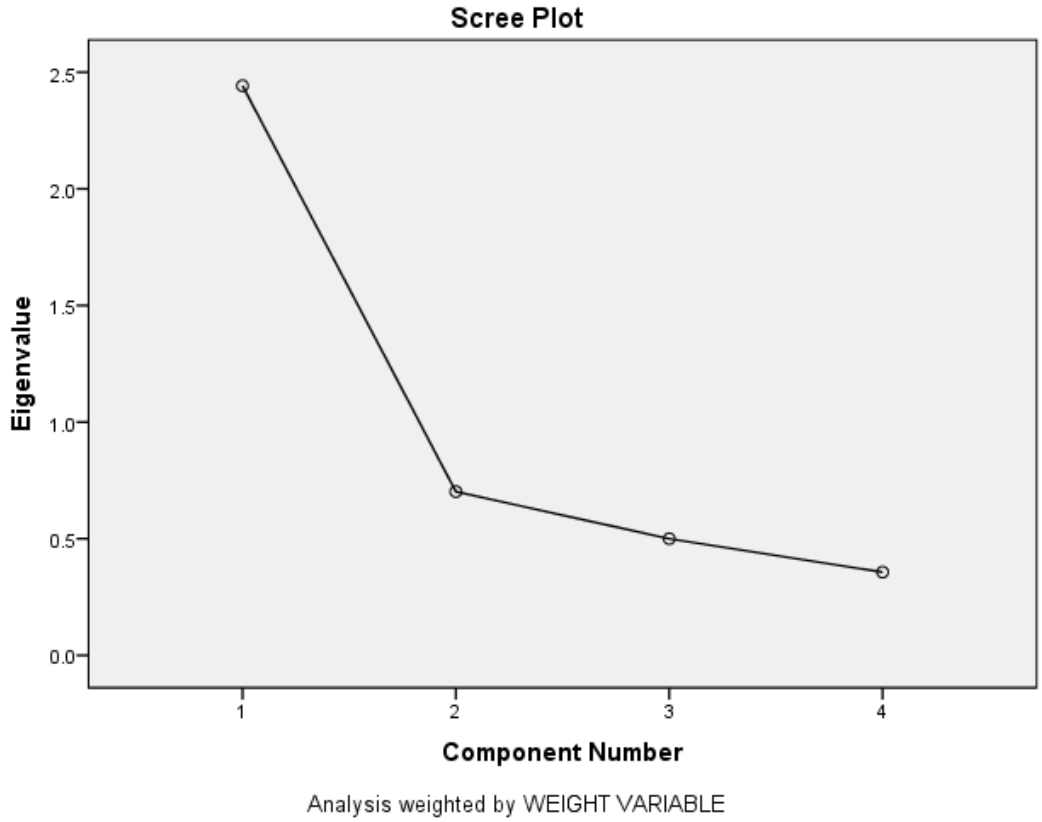


Figure 1. Scree plot of a principal components analysis conducted on the four religiosity variables of the General Social Survey (religious attendance, prayer frequency, biblical literalism, and strength of religious affiliation). A one-component solution was chosen based on the criterion of Eigenvalues being greater than 1. As the figure illustrates, explanatory power drops significantly after the first component.

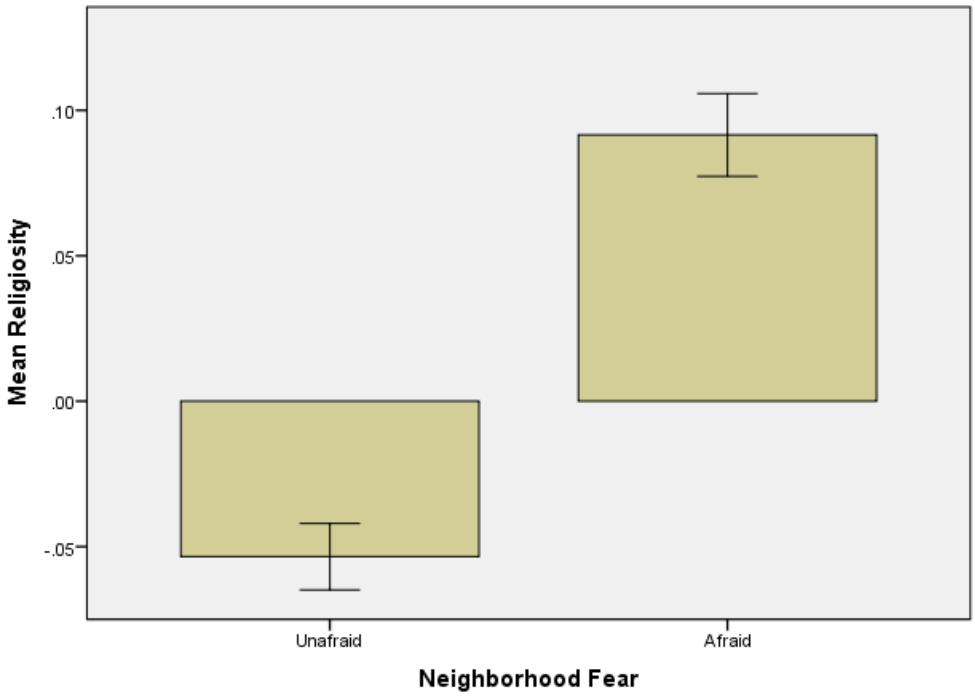
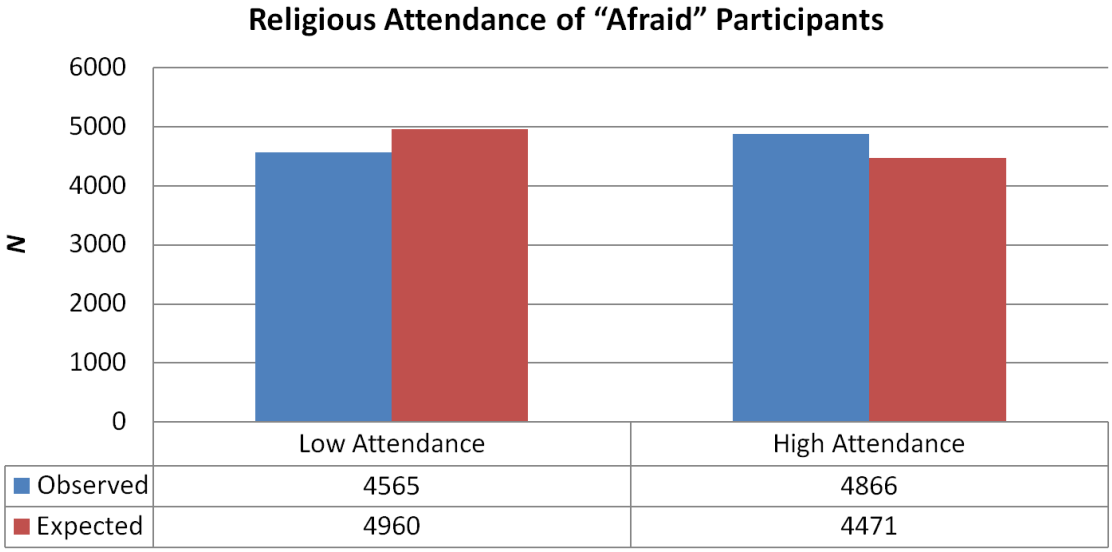


Figure 2. Mean religiosity scores for General Social Survey participants who responded "Yes" (Afraid) or "No" (Unafraid) to whether they are afraid to walk around their neighborhood at night. Participants who report being afraid have significantly higher religiosity scores compared to those who report being unafraid. Error bars represent 95% confidence intervals.

(a)



(b)

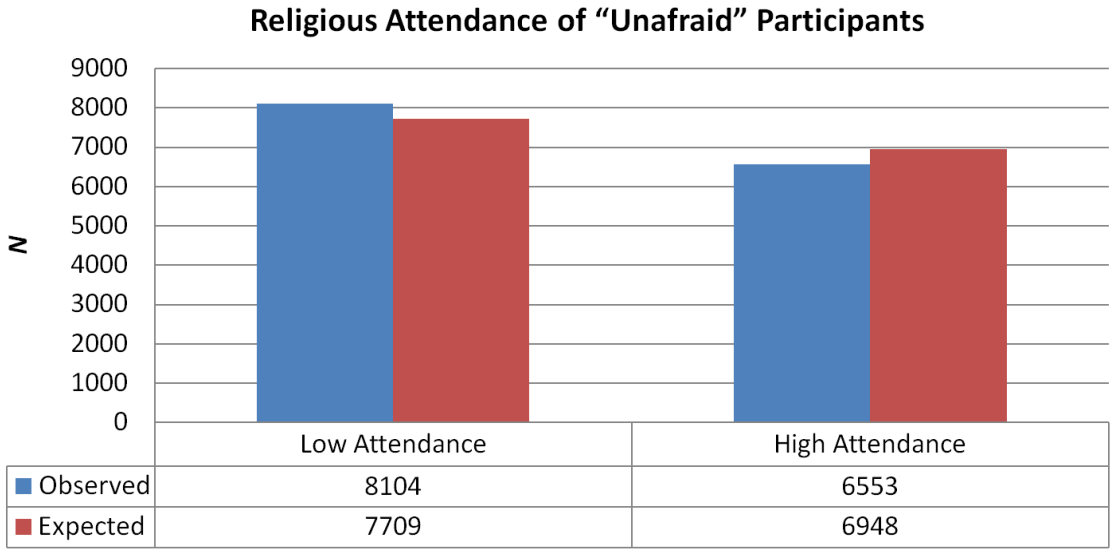
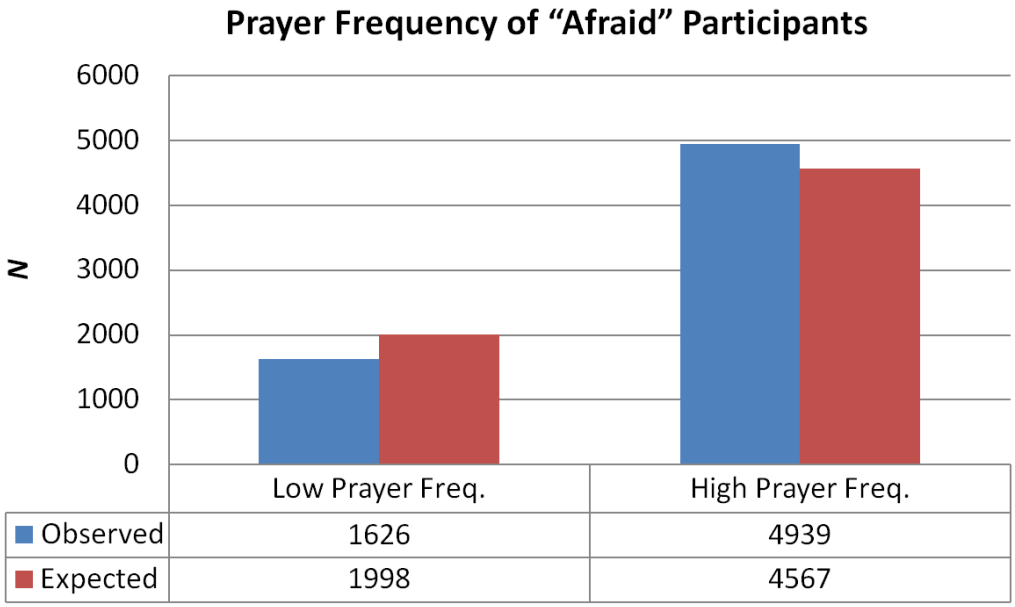


Figure 3. Observed (O) and expected (E) frequencies of responses on the General Social Survey regarding religious attendance for participants who are (a) afraid or (b) not afraid to walk around their neighborhood at night. Frequencies are based on a chi-square test of independence, $X^2(1, N = 23{,}681) = 101.51$, $p < .001$. There was a significant difference between O and E for both attendance categories (std. residual > $\pm$1.96).

(a)



(b)

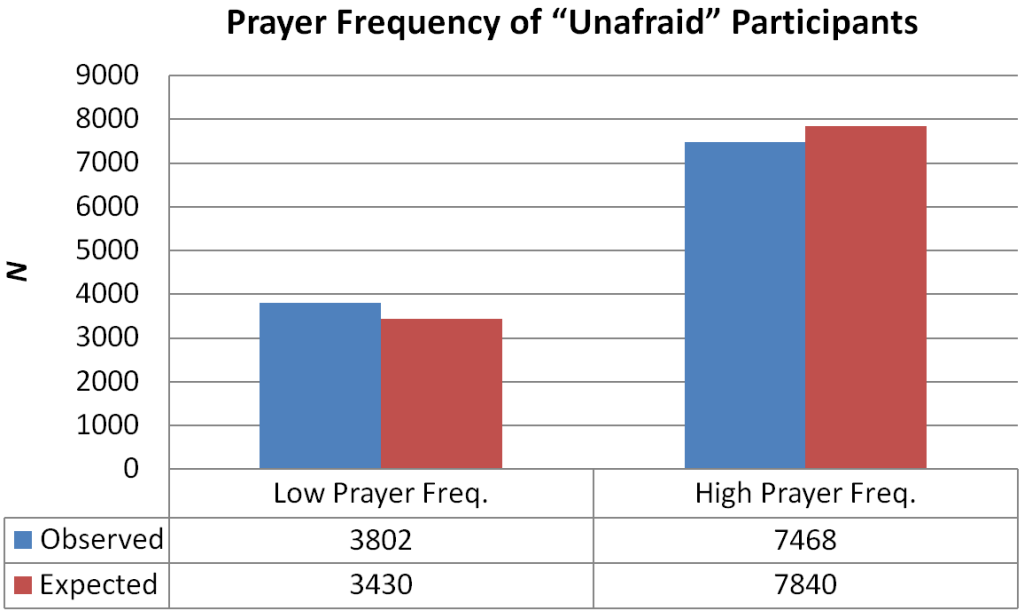
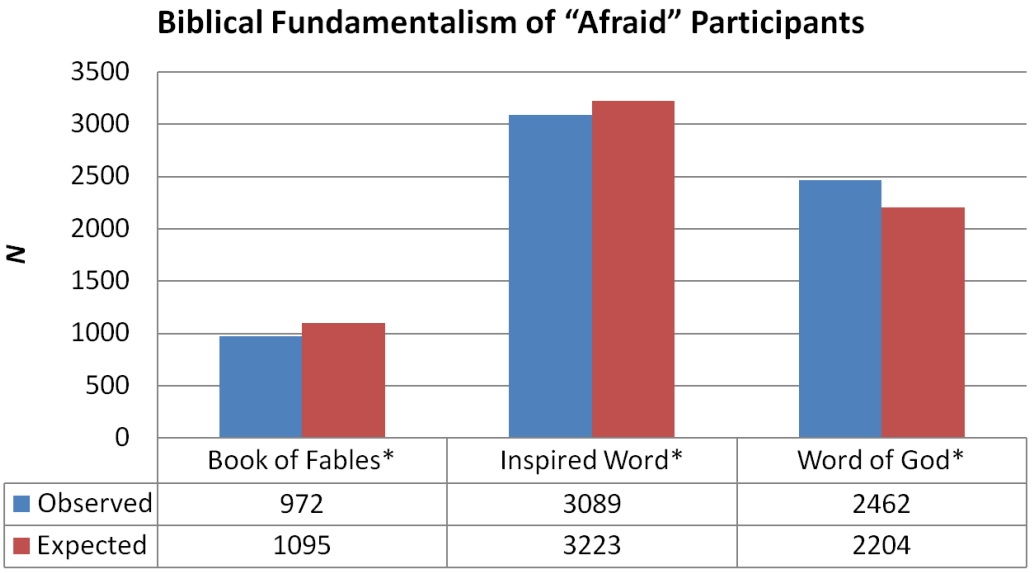


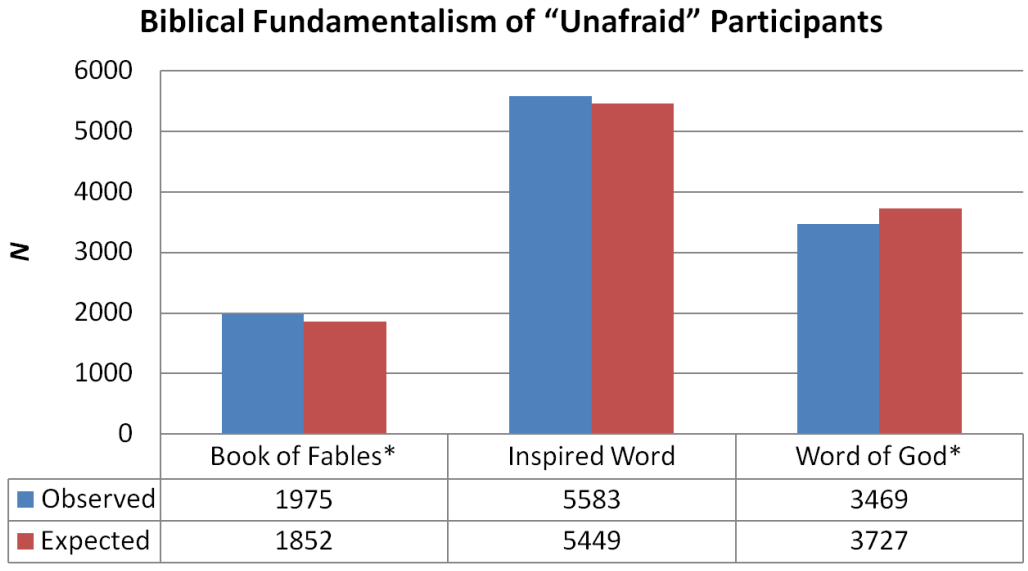
Figure 4. Observed (O) and expected (E) frequencies of responses on the General Social Survey regarding prayer frequency for participants who are (a) afraid or (b) not afraid to walk around their neighborhood at night. Frequencies based on chi-square test of independence, $X^2(1, N = 17{,}835) = 157.58$, $p < .001$. There was a significant difference between O and E for both prayer frequency categories (std. residual > ± 1.96).

(a)



	Book of Fables*	Inspired Word*	Word of God*
Observed	972	3089	2462
Expected	1095	3223	2204

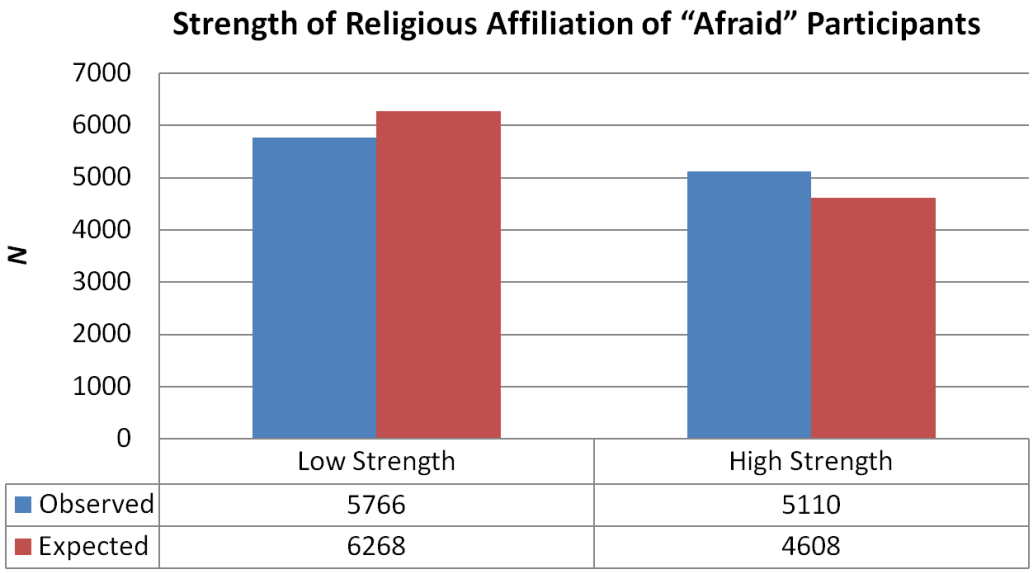
(b)



	Book of Fables*	Inspired Word	Word of God*
Observed	1975	5583	3469
Expected	1852	5449	3727

Figure 5. Observed (O) and expected (E) frequencies of responses on the General Social Survey regarding biblical fundamentalism (i.e., one's feelings about the Bible) for participants who are (a) afraid or (b) not afraid to walk around their neighborhood at night. Frequencies based on chi-square test of independence, $X^2(2, N = 17{,}550) = 78.89$, $p < .001$. * denotes categories with a significant difference between O and E (std. residual $> \pm 1.96$).

(a)



(b)

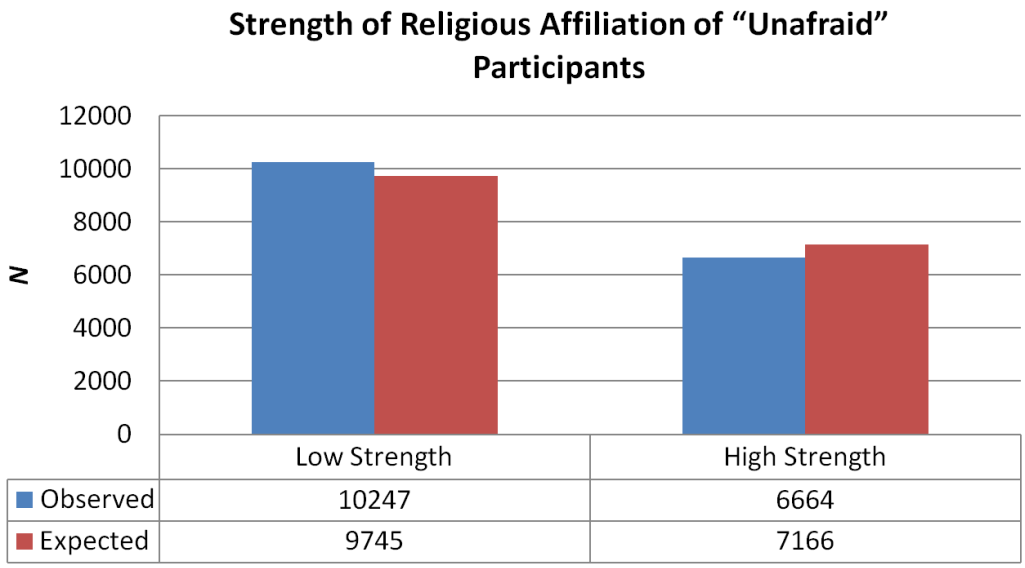


Figure 6. Observed (O) and expected (E) frequencies of responses on the General Social Survey regarding strength of religious affiliation for participants who are (a) afraid or (b) not afraid to walk around their neighborhood at night. Frequencies based on chi-square test of independence, $X^2(1, N = 27{,}787) = 155.66$, $p < .001$. Both affiliation categories exhibited a significant difference between observed and expected frequencies (std. residual > ± 1.96).

APPENDIX

Table A1.

Descriptive Statistics for Variables in the 1972-2012 GSS Data Set

Variable	*N*	*M*	*SD*	Mode	Range (Min-Max)
Age	56,194	44.37	17.00	23	71 (18-89)
Religious Attendance	55,821	3.84	2.71	7	8 (0-8)
Prayer Frequency	27,816	4.23	1.60	5	5 (1-6)
Biblical Fundamentalism	27,618	2.17	0.69	2	2 (1-3)
Strength of Affiliation	51,436	2.75	1.08	3	3 (1-4)
Religiosity	56,190	.0049	0.84	1.16	3.32 (-1.78-1.54)
Fear	33,652	1.39	0.49	1	1 (1-2)
Violent Crime Rate	56,355	499.61	153.21	650.51	810.45 (169.32-979.77)
Property Crime Rate	56,355	4062.05	899.40	3654.52	4418.57 (1977.28-6395.84)
Poverty Rate	45,703	13.13	2.68	12.90	14.56 (7.42-21.98)

Note. Violent crime rate, property crime rate, and poverty rate were added to the GSS data set based on values obtained from other data sets. Therefore, the *N*s for these variables simply reflect the number of corresponding cases for which values were added to the GSS data set. The *N* for poverty rate is lower because data were only available as early as 1980, as opposed to 1972 for crime rates.

Table A2.

Time Series Data Set, Unstandardized Values

Year	Violent Crime Rate	Property Crime Rate	Poverty Rate	Fear	Fear (mvr)	Religiosity	Religiosity (mvr)
1972	400.95	3560.44	-	-	-	.1918	.1918
1973	417.40	3737.03	-	1.3986	1.3986	.0472	.0472
1974	461.10	4389.33	-	1.4360	1.4360	.0791	.0791
1975	487.84	4810.67	-	-	1.4295	.0721	.0721
1976	467.82	4819.50	-	1.4230	1.4230	.0235	.0235
1977	475.93	4601.72	-	1.4302	1.4302	.0440	.0440
1978	497.82	4642.51	-	-	1.4257	.0019	.0019
1979	548.86	5016.61	-	-	1.4257	-	.0293
1980	596.64	5353.33	13.32	1.4213	1.4213	.0567	.0567
1981	594.30	5263.85	14.18	-	1.4347	-	.0433
1982	571.14	5032.52	15.08	1.4480	1.4480	.0299	.0299
1983	537.69	4637.34	15.38	-	1.4262	.0417	.0417
1984	539.16	4492.12	14.19	1.4043	1.4043	.1056	.1056
1985	556.59	4650.50	14.02	1.3904	1.3904	.0655	.0655
1986	617.72	4862.64	13.82	-	1.3826	.0959	.0959
1987	609.70	4940.30	13.25	1.3747	1.3747	.0500	.0500
1988	637.17	5027.07	12.79	1.3795	1.3795	.0099	.0099
1989	663.09	5077.93	12.66	1.3848	1.3848	.0081	.0081
1990	731.83	5088.46	13.28	1.3899	1.3899	.0162	.0162
1991	758.11	5139.68	13.68	1.4293	1.4293	.0664	.0664
1992	757.51	4902.70	14.23	-	1.4197	-	.0457
1993	747.10	4740.00	14.35	1.4101	1.4101	.0250	.0250
1994	713.55	4660.00	13.23	1.4541	1.4541	.0015	.0015
1995	684.59	4591.31	13.12	-	1.4313	-	-.0249
1996	636.50	4450.06	13.07	1.4084	1.4084	-.0512	-.0512
1997	610.82	4316.30	12.76	-	1.4001	-	-.0418
1998	567.48	4051.79	12.40	1.3918	1.3918	-.0323	-.0323
1999	522.95	3743.55	11.45	-	1.3843	-	-.0424
2000	506.53	3618.26	10.87	1.3767	1.3767	-.0525	-.0525
2001	504.43	3658.10	11.37	-	1.3436	-	-.0420
2002	494.38	3630.63	11.79	1.3104	1.3104	-.0315	-.0315

Year	Violent Crime Rate	Property Crime Rate	Poverty Rate	Fear	Fear (mvr)	Religiosity	Religiosity (mvr)
2003	475.84	3591.22	11.85	-	1.3063	-	-.0108
2004	463.16	3514.10	12.11	1.3022	1.3022	.0099	.0099
2005	469.04	3431.54	12.27	-	1.3268	-	-.0251
2006	479.30	3346.60	11.85	1.3514	1.3514	-.0600	-.0600
2007	471.80	3276.40	11.80	-	1.3393	-	-.0766
2008	458.60	3214.60	12.50	1.3272	1.3272	-.0931	-.0931
2009	431.88	3041.32	13.59	-	1.3271	-	-.0933
2010	404.50	2945.90	14.19	1.3270	1.3270	-.0935	-.0935
2011	387.05	2905.36	14.31	-	1.3321	-	-.0957
2012	386.88	2859.20	14.30	1.3371	1.3371	-.0979	-.0979

Note. mvr = missing values replaced. Missing values were replaced by calculating the median of the nearest value above and below the missing value.

Table A3.

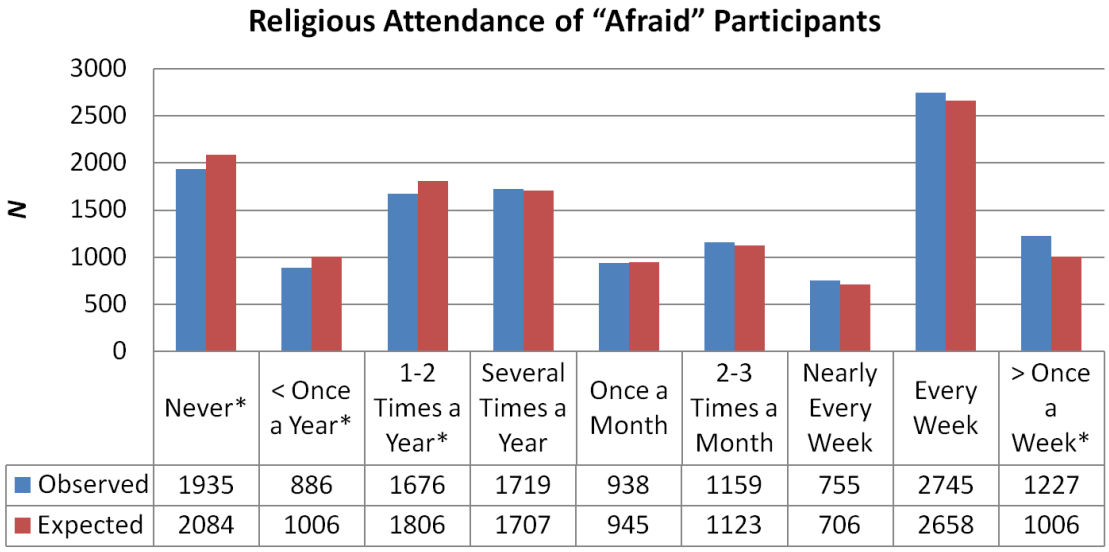
Time Series Data Set, Standardized Values

Year	Violent Crime Rate	Property Crime Rate	Total Crime Rate	Poverty Rate	Fear (mvr)	Religiosity (mvr)
1972	-.4622	-.2892	-.3757	_	_	2.9227
1973	-.3613	-.1170	-.2392	_	.2862	.6630
1974	-.0933	.5191	.2129	_	1.1377	1.1615
1975	.0707	.9300	.5003	_	.9897	1.0521
1976	-.0521	.9386	.4432	_	.8417	.2926
1977	-.0024	.7262	.3619	_	1.0057	.6130
1978	.1319	.7660	.4490	_	.9043	-.0449
1979	.4449	1.1308	.7879	_	.9043	.3832
1980	.7380	1.4592	1.0986	.1749	.8030	.8114
1981	.7236	1.3719	1.0478	.9384	1.1070	.6020
1982	.5816	1.1463	.8640	1.7375	1.4109	.3926
1983	.3764	.7609	.5687	2.0039	.9134	.5770
1984	.3855	.6193	.5024	.9473	.4160	1.5756
1985	.4923	.7738	.6331	.7964	.0995	.9490
1986	.8672	.9807	.9239	.6188	-.0792	1.4240
1987	.8180	1.0564	.9372	.1127	-.2579	.7067
1988	.9866	1.1410	1.0638	-.2957	-.1486	.0801
1989	1.1455	1.1906	1.1680	-.4111	-.0280	.0520
1990	1.5671	1.2009	1.3840	.1394	.0881	.1785
1991	1.7283	1.2508	1.4895	.4945	.9852	.9630
1992	1.7246	1.0197	1.3722	.9828	.7666	.6395
1993	1.6607	.8611	1.2609	1.0894	.5480	.3161
1994	1.4550	.7830	1.1190	.0950	1.5498	-.0512
1995	1.2774	.7161	.9967	-.0027	1.0296	-.4630
1996	.9824	.5783	.7804	-.0471	.5093	-.8747
1997	.8249	.4479	.6364	-.3223	.3204	-.7271
1998	.5592	.1899	.3745	-.6419	.1314	-.5794
1999	.2860	-.1107	.0877	-1.4854	-.0405	-.7372
2000	.1853	-.2329	-.0238	-2.0004	-.2124	-.8951
2001	.1725	-.1940	-.0108	-1.5564	-.9671	-.7310
2002	.1108	-.2208	-.0550	-1.1835	-	-.5669

Year	Violent Crime Rate	Property Crime Rate	Total Crime Rate	Poverty Rate	Fear (mvr)	Religiosity (mvr)
					1.7219	
2003	-.0029	-.2592	-.1311	-1.1303	-1.8152	-.2434
2004	-.0807	-.3344	-.2076	-.8994	-1.9085	.0801
2005	-.0446	-.4149	-.2298	-.7574	-1.3485	-.4661
2006	.0183	-.4978	-.2397	-1.1303	-.7884	-1.0123
2007	-.0277	-.5662	-.2970	-1.1747	-1.0639	-1.2709
2008	-.1086	-.6265	-.3676	-.5532	-1.3394	-1.5295
2009	-.2725	-.7955	-.5340	.4146	-1.3416	-1.5327
2010	-.4404	-.8885	-.6645	.9473	-1.3439	-1.5358
2011	-.5474	-.9281	-.7378	1.0539	-1.2289	-1.5702
2012	-.5485	-.9731	-.7608	1.0450	-1.1140	-1.6045

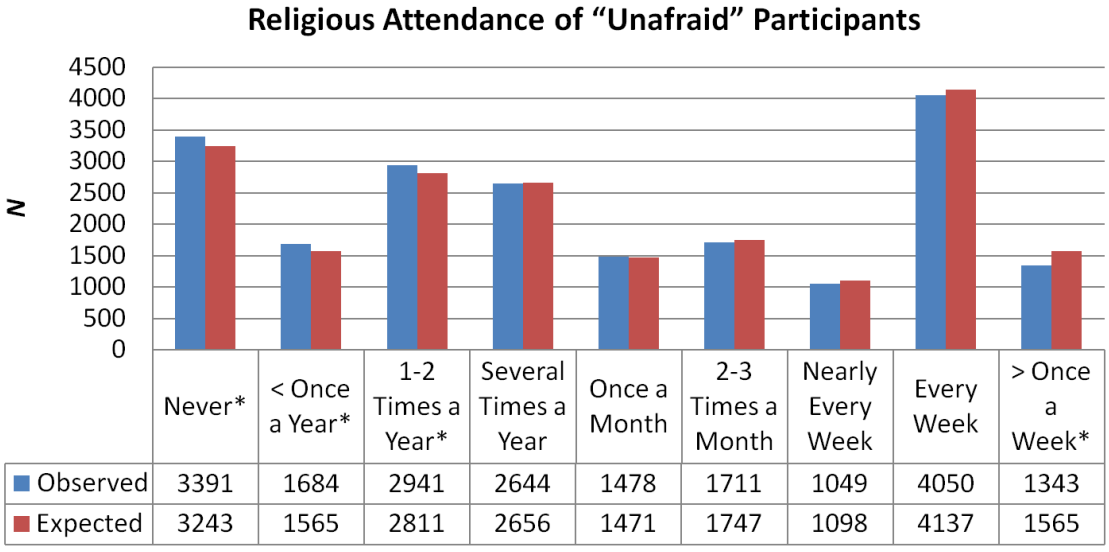
Note. mvr = missing values replaced. Table values represent *z*-scores of variables shown in Table A2. These are the values that were used in vector autoregression analyses.

(a)



	Never*	< Once a Year*	1-2 Times a Year*	Several Times a Year	Once a Month	2-3 Times a Month	Nearly Every Week	Every Week	> Once a Week*
Observed	1935	886	1676	1719	938	1159	755	2745	1227
Expected	2084	1006	1806	1707	945	1123	706	2658	1006

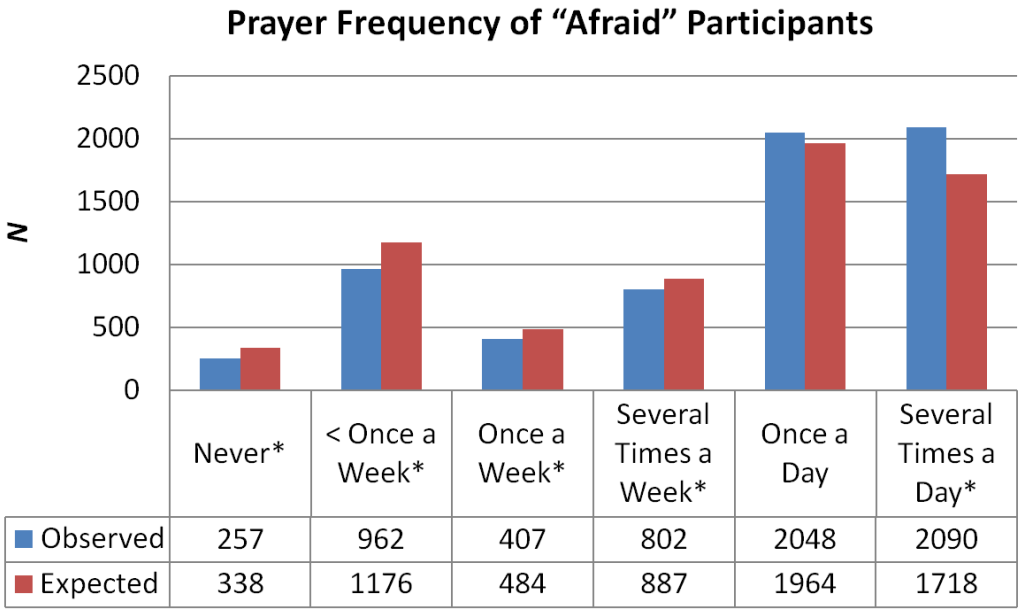
(b)



	Never*	< Once a Year*	1-2 Times a Year*	Several Times a Year	Once a Month	2-3 Times a Month	Nearly Every Week	Every Week	> Once a Week*
Observed	3391	1684	2941	2644	1478	1711	1049	4050	1343
Expected	3243	1565	2811	2656	1471	1747	1098	4137	1565

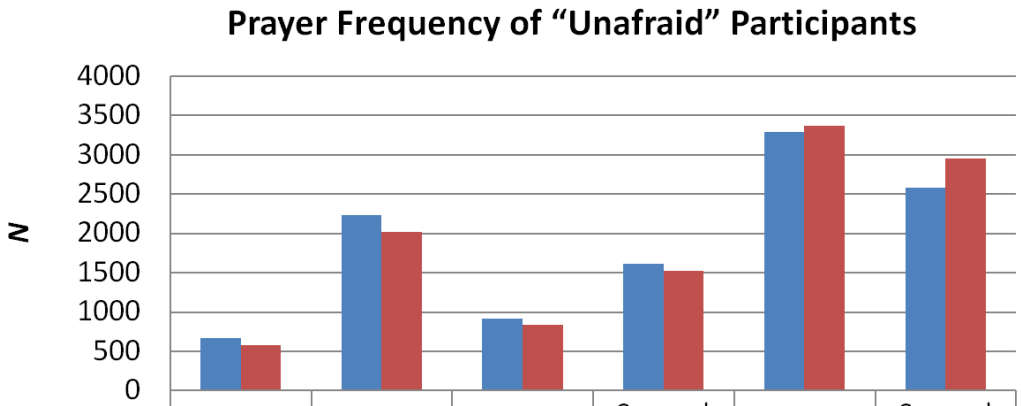
Figure A1. Observed (O) and expected (E) frequencies of responses on the General Social Survey regarding religious attendance for participants who are (a) afraid or (b) not afraid to walk around their neighborhood at night. Frequencies are based on a chi-square test of independence, $X^2(8, N = 33{,}331) = 148.79$, $p < .001$, $\varphi_c = .07$. * denotes categories with a significant difference between O and E (std. residual > $\pm$1.96).

(a)



	Never*	< Once a Week*	Once a Week*	Several Times a Week*	Once a Day	Several Times a Day*
Observed	257	962	407	802	2048	2090
Expected	338	1176	484	887	1964	1718

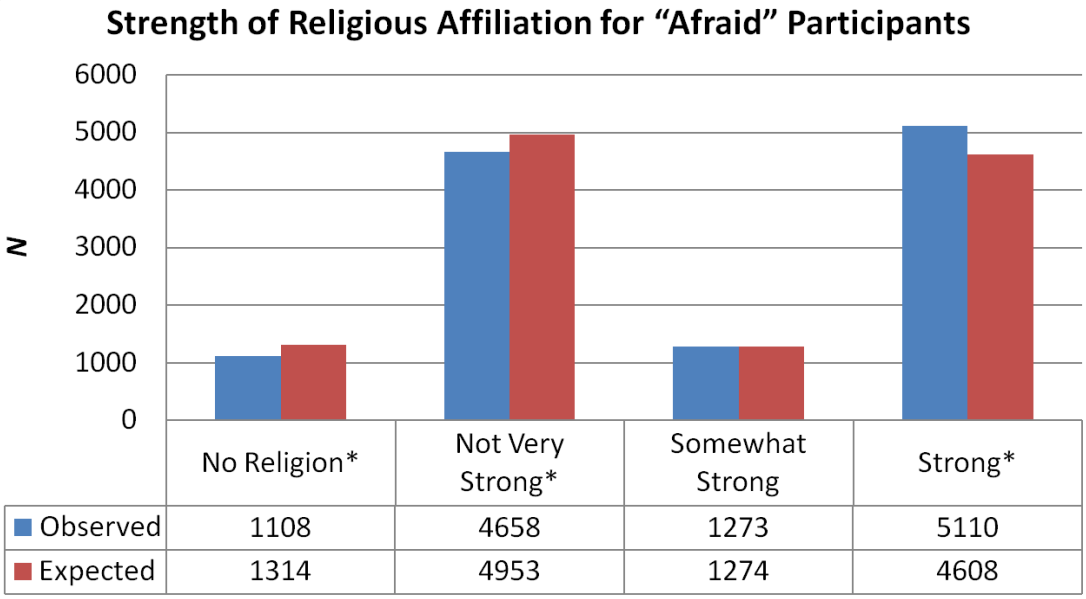
(b)



	Never*	< Once a Week*	Once a Week*	Several Times a Week*	Once a Day	Several Times a Day*
Observed	661	2232	908	1606	3287	2576
Expected	580	2018	831	1522	3371	2948

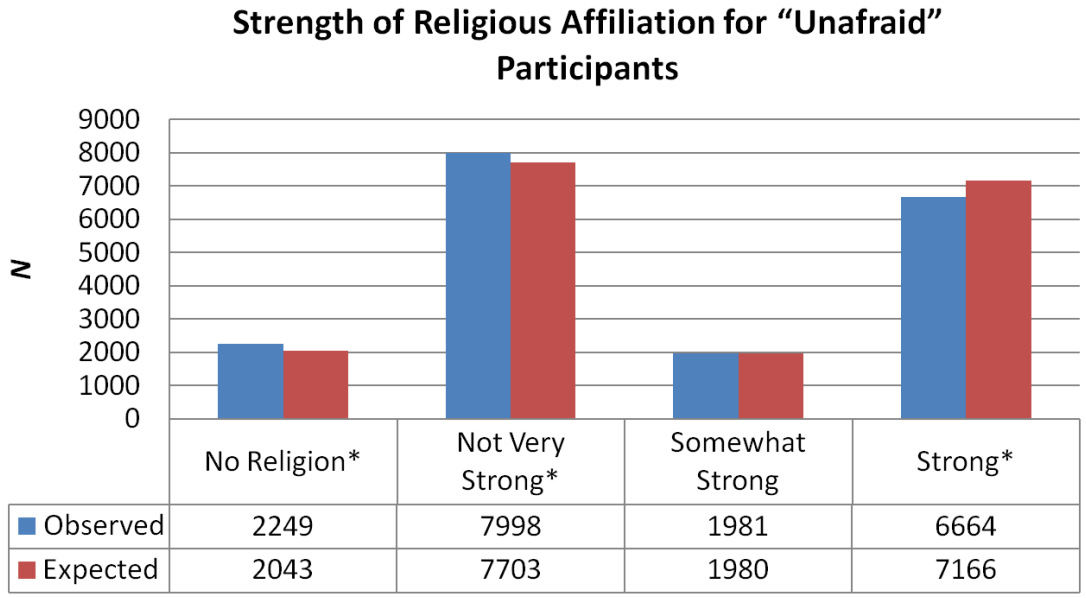
Figure A2. Observed (O) and expected (E) frequencies of responses on the General Social Survey regarding prayer frequency for participants who are (a) afraid or (b) not afraid to walk around their neighborhood at night. Frequencies based on chi-square test of independence, $X^2(5, N = 17{,}836) = 257.77$, $p < .001$, , $\varphi_c = .12$. * denotes categories with a significant difference between O and E (std. residual > $\pm$1.96).

(a)



	No Religion*	Not Very Strong*	Somewhat Strong	Strong*
Observed	1108	4658	1273	5110
Expected	1314	4953	1274	4608

(b)



	No Religion*	Not Very Strong*	Somewhat Strong	Strong*
Observed	2249	7998	1981	6664
Expected	2043	7703	1980	7166

Figure A3. Observed (O) and expected (E) frequencies of responses on the General Social Survey regarding strength of religious affiliation for participants who are (a) afraid or (b) not afraid to walk around their neighborhood at night. Frequencies based on chi-square test of independence, $X^2(3, N = 31{,}041) = 171.74$, $p < .001$. * denotes categories with a significant difference between O and E (std. residual > $\pm$1.96).

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