SECULARISM & NONRELIGION

Explaining Global Secularity: Existential Security or Education?

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ABSTRACT: At the time of data analysis for this report there were 193 countries in the world. Various institutions – the United Nations, the World Health Organization, the CIA, the World Values Survey, Gallup, and many others – have performed sophisticated statistical analyses on cross-national data. The present investigation demonstrates that valid and reliable data concerning religiosity and secularity exist for most countries and that these data are comparable. Cross-national data relating to social, political, economic and cultural aspects of life were tested for correlation with religiosity/secularity. In contrast to the most widely accepted general account of secularity, the Existential Security Framework *(ESF; Norris & Inglehart, 2004), secularity was not most highly related to material security, though these were highly related. Rather, secularity was most strongly related to the degree of formal education attained. Material security explained no significant variance beyond education. Thus, religion's primary function in the world today is being replaced, not so much by the pseudo-materialistic supplication for better living conditions as posited by the ESF, but by contemporary education – extensive knowledge of contemporary cultures, philosophy, modes of thought or processes of reasoning.*

KEYWORDS: RELIGIOSITY, SECULARITY, MODERNITY, CROSS-NATIONAL, EDUCATION, EXISTENTIAL SECURITY

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Introduction

Cross-national data have informed several proposals concerning secularity. One proposal posits that since secularity is higher in wealthier countries than in poorer ones (see Barro & McCleary, 2003, for mixed results; McCleary & Barro, 2006, for definitive results), religiosity functions as a *supplication for material advantage*. Indeed, since relevant statistics have been available on a large scale, the greatest declines in religiosity have been observed in the world's wealthier countries (Norris & Inglehart, 2004). This model, however, is strained by significant exceptions: for example, the USA is wealthy and religious, whilst Vietnam is relatively poor and secular (Rees, 2009).

The Existential Security Framework (ESF), a more commonly cited proposal, offers a more nuanced explanation of the relationship between wealth and secularity. Derived from analysis of a larger set of cross-national databases, the ESF proposes that objective sources of material security, specifically healthy, wealthy, financially secure living conditions, lead to secularity (Norris & Inglehart, 2004). According to the ESF, the degree of *egalitarian* economic development of a society, rather than the gross national product (GNP) of that society overall, is thought to be the most likely cause of higher rates of secularity. This model has been highly influential and, subsequent to its emergence in 2004, many cross-national analyses of secularity have examined specific mechanisms of secularization without attempting to challenge the ESF.

Cross-national research relating to the ESF is summarized and grouped into 16 domains termed "mini-models" below. Because most good quality worldwide cross-national databases consist of indicators of quality of life agreed upon by the United Nations (as well as a few other international organizations), and since these indicators are interpreted as objectives to be attained by as many member countries as possible, only cross national databases that could be considered obvious indicators of successful modernity were selected for analysis. Cross-national research on secularity has consistently upheld a unifying theory, more general than the ESF. This is that *secularity is favored by successful modernity*. The mini-models formulated next are all formatted according to this general theme. However, only some of these models are consistent with the ESF, with other models deviating from that model in minor or major ways.

Mini-models highly compatible with the ESF

1. WEALTH PER CAPITA

Wealth is thought to give rise to secularity by fulfilling the material needs that individuals otherwise turn to God(s) to fulfill. Cross-national analyses demonstrate that purchasing power per capita is related to secularity (Barro & McCleary, 2003; Norris & Inglehart, 2004; Rees, 2009; Verweij, Ester & Nauta, 1997; Wuthnow, 1977).

2. HIGH LIFE EXPECTANCY

Religion promises life after death, a yearning which might be expected to wane when life is very long. In keeping with this, low rates of mortality and high life expectancy correlate with secularity (Norris & Inglehart, 2004; Filmer & Pritchett, 1999; Rees, 2009).

3. STATE-PROVIDED SECURITY

The USA is an exception to the notion that secularization is caused by modernization, at least in the sense that the country is highly industrialized and wealthy, but also highly religious. To account for this exception, several analysts have proposed that the more important factor in secularization is not wealth itself but the redistribution of wealth and its benefits (i.e., education, health and welfare) within the population. Accordingly, the more welfare is provided and advertised by a nation-state, the more its population is secular (Gill & Lundsgaarde, 2004; Hollinger, Haller & Valle-Hollinger, 2007). Taxation in percentage of GDP is a general indicator of state involvement in citizens' wellbeing and this index is also significantly associated with secularity (Barber, 2011).

4. ECONOMIC EGALITARIANISM

Even in welfare states, inequality can be extreme and redistribution of wealth can vary independently from the money spent by the State (e.g., due to racism, weak federal standards in education and health, etc.). Here, secularity is thought to be favored by economic egalitarianism because it replaces the religious need for personal dignity. Accordingly, equality of purchasing power is correlated with secularity, independent of a country's wealth (Barber, 2011; De La O & Rodden, 2008; Norris & Inglehart, 2004; Muller, 2009; Paul, 2009; Rees, 2009).

Mini-models incompatible with or less compatible with the ESF

5. LOW BIRTH RATE

Secular modernity, as reflected in the agenda of the United Nations (Working Group on the Declaration on the Human Environment, 1972), recognized the problem of global overpopulation four decades ago, and continues to do so. Birth control is a self-empowering gesture which can involve a rejection of religious pressures to procreate, and even by extension, of religion itself. Countries with low fertility (i.e., birth rates) are indeed more secular (Frejka, Charles & Westoff, 2008; Kaufmann, 2009; Norris & Inglehart, 2004).

6. FORMAL EDUCATION

Secular modernity is associated with a drive to eradicate illiteracy. The world's currently dominant religions have been propagated in large part by word of mouth, from literate authority figures to illiterate underlings, with little change occurring until the advent of the printing press. Prevalence of literacy per country is indeed correlated with secularity (Müller, 2009; Norris & Inglehart, 2004; Zuckerman, 2009; Wuthnow, 1977). Scientific development of countries is also related to secularity (Wuthnow, 1977) as is prevalence of higher education (Barber, 2011).

7. INFORMAL EDUCATION

Secularity flourishes in the context of the globalization of knowledge. Global knowledge is not restricted to formal educational settings, including religious educational settings, but may come through informal knowledge networks and practices: internet, satellite television, radio (particularly short wave), travel, telephone, etc. Per capita internet connections, telephones, radios, televisions and computers correlate with secularity (Armfield & Holbert, 2003; Halman & Draulans, 2006; Norris & Inglehart, 2004).

8. GENDER EQUALITY

Religious beliefs, practices and institutions often support patriarchy. Accordingly, countries with more gender equality are more secular (Inglehart & Norris, 2003; Luck, 2006; Verweij, Ester & Nauta, 1997).

9. CHILDREN'S WELL-BEING

Secular modernity strips parents of religiously bolstered absolute rights and control over their children, affirms a child's right to a good quality of life, and insists on the right to formal education of each child (Dwyer, 1994). While not a direct manifestation of child freedoms, research has shown that secular countries present lower infant mortality (Norris & Inglehart, 2004; Rees, 2009).

10. RELIGIOUS FREEDOM

Secular modernity promotes religious freedom. Religious pluralism, including non-religion, can only be tolerated in contexts where no one religion is enshrined by the state and such pluralism can hardly exist in contexts where adherence to one religion may be promoted through fear (e.g., in Pakistan, 74 % of the population agrees with the death penalty for apostasy from Islam; Kohut, 2010). Religious freedom therefore correlates with secularity on a cross-national basis (Grim & Finke, 2006; Müller, 2009; Verweij, Ester & Nauta, 1997). Müller (2009) even found that the total number of religiously based laws per country was negatively correlated with secularity.

11. PACIFISM OF THE STATE

By promoting uniform cultural identities and a willingness to fight for one's in-group, religion may bolster aggressive militaristic regimes (Norenzayan & Shariff, 2008: Rees, 2009). Peaceful countries tend to be more secular (Rees, 2009).

12. PERMISSIVE CULTURE

Authoritarian, punitive and puritanical regimes are associated with religiosity, while permissive countries are more secular. Accordingly, freedom of the press correlates with secularity cross-nationally (Connoly-Ahern & Golan, 2007).

13. POLITICAL FREEDOM

Contemporary, secular nation-states usually have democratic forms of government while theocracies are more likely to be totalitarian. Political oppression correlates with religiosity whereas political freedom correlates with secularity cross-nationally (Müller, 2009).

14. STATESMANSHIP

Secular modernity affirms the value of good statesmanship and the elimination of corruption. Theocracies tend to promote a less refined art of statesmanship as somewhat corrupt dictatorships materially favor certain families or clans. Accordingly, countries with corrupt political institutions are less secular (Rees, 2009).

15. VALUE OF HUMAN LIFE

The United Nations affirms a high value of human life. However, it differs from most religions in which aspects of human life it values. For example, it denounces the death penalty and strives towards the reduction of abortion rates by promoting preventative birth control. In other respects, it is in accordance with the major religions in denouncing homicide and combatting suicide. Abortion and homicide are significantly negatively correlated with secularity cross-nationally (Fajnzylber, Lederman & Loatza, 2002; Jensen, 2006; Fox & Levin, 2000; Paul, 2005; Rees, 2009). However, secular countries have higher suicide rates (Neeleman & Lewis, 1990; Stack, 1983). Some claim that religiosity protects against suicide by granting human life an absolute, transcendent value (Jensen, 2006; Rees, 2009; Verbakel & Jaspers, 2010). However, Zuckerman (2009) notes that eight of the most suicide-prevalent nations in the world are post-Soviet countries, and suggests that decades of totalitarianism, economic depression, and a lack of basic human freedoms may contribute more than secularity to the high rates of suicide.

16. PROPHYLAXIS

Religions often prohibit certain health-related behaviors, such as the consumption of psychotropic drugs and risky sex on moral grounds, and religion is negatively correlated with the abuse of alcohol and opiates cross-nationally (Benson, 1992; Gorsuch, 1995). However, the health-related prohibitions of scriptural religions do not depend on the science-based findings of contemporary public health research. Modern, secular institutions and governments, on the other hand, draw upon science-based public health research to promote healthy lifestyles. Negative rates of HIV infection and secularity have been documented to be correlated on a cross-national basis (Rees, 2009). However, this relation could be due to reduced impact of religious prohibition of contraception in secular countries. More to the point, rates of zoonotic infection are negatively correlated with secularity cross-nationally (Fincher & Thornhill, 2008), as are general rates of infection (Barber, 2011).

Cross-national statistics can only ambiguously support any of these 16 “mini-models.” For example, low infant mortality could be related to secularity because it derives from wealth, from education, from the availability of good services to women (who are often also mothers) or from some combination of all three. Likewise, low fertility could be due to prosperity, to the education of women, to the positive consideration of women’s desires, or to some combination of all three. A thoughtful and thorough review of large numbers of correlations and partial correlations can justify conclusions about specific mechanisms. Yet even such conclusions will remain tentative.

Purposes of the present investigation

The general purpose of the present investigation was to update and extend the work of Norris and Inglehart (2004) who were the first to explore the relationship between a sizable array of cross-national statistics and religiosity/secularity and the first to propose a general explanatory framework of religiosity/secularity based on such statistics. Cross-national statistics have expanded tremendously since the turn of the millennium, and that has included measures of religiosity/secularity (for which the cross-national sampling has more than doubled with Gallup). Certain countries have also continued a rapid progression toward secularity, providing more explainable variance.

The present investigation attempted to approach cross-national statistics with as open a mind as possible, a conservative exploitation of statistics, and an exhaustive review of the numerous available

databases.

The *specific* purposes of this investigation were to answer the following four questions: 1) Do cross-national measures of religiosity and secularity have an inverse relationship? 2) Are cross-national measures of religiosity/secularity reliable and valid? 3) What are the strongest cross-national correlates of religiosity/secularity? 4) Are there several distinct causes of national religiosity/secularity or is a single cause more credible?

Method

All cross-national distributions of data used for this report were collected by the author, at no expense to him, from various websites. Selection was based on the principles of full accessibility, easy verification and replicability of the analyses. The databases selected also had to be relevant to the general theme of *secularity-by-successful modernization*. An additional criterion for selection was for the databases to cover as many countries as possible. Finally, once all the previous criteria were met, the most recent database available was selected.

The distributions were assembled into an Excel spreadsheet and then analyzed with SPSSv18 for Macintosh. The SPSS version of the database is available as a supplemental file on the journal's website.

Measures of religiosity and secularity

The World Values Survey (WVS) is a survey carried out by The World Values Survey Association, a nonprofit organization consisting of a network of university-based social scientists. Its central office is located at the Center for the Study of Democracy at Leuphana University in Sweden. Its board members are elected by a general assembly which operates democratically. Social scientists from participating countries agree on uniform survey questions and share the information gathered free of charge. Country-by-country statistics on values, beliefs and behaviors were gathered in 1981, 1990-1991, 1995-1996, 1999-2001 and 2005-2007 with the last survey covering 97 countries. The question covering religiosity/secularity on these surveys is as follows: "How important is God in your life? Please use this scale to indicate – 10 means very important and 1 means not at all important." In the present study, country-by-country prevalence from the 2005-2007 survey of the first category "very important" was used as an index of religiosity while "not at all important" was used as an index of secularity. The WVS survey of 2007 contained a question concerning church attendance: "I attend a religious service at least once a week." Response options were "no = 0" and "yes = 1".

Gallup, a private company, has facilitated research on human beliefs and behaviors, including religiosity and secularity, for more than 75 years through the work of scientists in management, economics, psychology and sociology. The data from one such survey of 114 countries in 2009 and another survey of 142 countries from 2010 were retrieved free of charge. To determine religiosity and secularity, Gallup asked for "yes" or "no" answers to the following statements respectively: "Religion is important in my life" and "Religion is not important in my life". Most of the non-subjective variables utilized here have not been analyzed previously in relation to religiosity/secularity.

Non-subjective cross-national databases judged relevant to religiosity/secularity, grouped into 16 "mini-models" and analyzed in the present investigation:

1. WEALTH/ECONOMIC DEVELOPMENT

Variables: 1) Purchasing power (IMF 2010), 2) Purchasing power (CIA Factbook 2010), 3) Gross national income per capita (UNICEF 2007) 4) Persons per room (UN 2010), 5) Hunger (IFPRI 2008), 6) Percent with Drinking Water (UNICEF 2002), 7) Percent with Sanitation (UNICEF 2002), 8) Percent of population living on less than a dollar a day (UNICEF 2003), 9) Intensity of deprivation (UN 2008), 10) Multidimensional poverty index (UN 2008), 11) Gross domestic product (CIA Factbook 2011), 12) Gross domestic product (WB 2009), 13) Unemployment (CIA Factbook 2010), 14) Rate of unemployment (EIU 2010), 15) Doctors per 1,000 (WB 2003), 16) Percent of population affected by natural disasters (UN 2008), 17) Savings per household (WB 2010), 18) Unemployment rate (ILO 2010).

2. STATE PROVIDED SECURITY

Variables: 1) Proportion GDP for public health (WB 2009), 2) Proportion GDP for education (UN-WDP-2007), 3) Percent of infants receiving tuberculosis vaccine (UNICEF 2003), 4) Percent of infants receiving DPT3 vaccine (UNICEF 2003), 5) Percent of infants receiving polio vaccine (UNICEF 2003), 6) Percent of infants receiving measles vaccine (UNICEF 2003), 7) Percent of government expenditures spent on education (UNICEF 2003), 8) Workers rights (CIRI 2009), 9) Percent GDP devoted to education (UNESCO 2010), 10) Percent receiving EPI Vaccine (UNICEF 2003), 11) Percent receiving Hepatitis-B shot (UNICEF 2003), 12) Percent of government expenditures on health (UNICEF 2003), 13) Tax burden (HF 2010).

3. ECONOMIC EGALITARIANISM

Variables: 1) Inequality of purchasing power (Gini-UN 2007), 2) Percent of GDP of the richest 10 Percent (WB 2002), 3) Gini index (CIA Factbook 2008, 4) Gini index (CIA Factbook 2012).

4. HIGH LIFE EXPECTANCY

Variables: 1) Global mortality (CIA Factbook 2011), 2) Life expectancy (WHO 2007), 3) Life expectancy (UN-WPP 2010), 4) Quality of health system (WHO 2000).

5. LOW BIRTH RATE

Variables: 1) Fertility birth rate (UN 2005), 2) Fertility rate (CIA Factbook 2010), 3) Adolescent fertility rate (UN 2010), 4) Adolescent fertility rate (UN DESA 2009), 5) Population growth (UN 2010), 6) Median age (CIA Factbook 2009).

6. FORMAL EDUCATION

Variables: 1) Percent adults who can read (UNESCO 2008), 2) Percent adults who can read (UN 2007), 3) Global education Index (UN 2007), 4) Percent with higher education (UNESCO 2010), 5) Academic productivity (Scopus 2009), 6) Books per capita (CIA Factbook 2008), 7) Primary school education (WB 2005), 8) IQ (Lynn, Harvey & Nyborg, 2009).

7. INFORMAL EDUCATION

Variables: 1) Televisions per capita (CIA 2011), 2) Internet per capita (CIA Factbook 2008), 3) Networked unreadiness index (WEF 2007), 4) Telephones per capita (CIA Factbook 2008), 5) Internet users (WB 2010).

8. GENDER EQUALITY

Variables: 1) Maternal mortality at childbirth (UN 2010), 2) Proportion of women over men who can read (UN 2007), 3) Life expectancy of women over men (WHO 2007), 4) Access to contraception ranking (WB 2008), 5) Date women obtained vote (Wikipedia 2007), 6) Status of women index (WEF 2010), 7) Contraception (UN 2010), 8) Days of maternity leave (UN 2010), 9) Percent women managers, legislators, officials (UN 2010), 10) Ratio of men to women (CIA Factbook 2011), 11) Female-to-male secondary education (Barro & Lee, 2010) 12) Female to male parliamentarians (UPI 2010), 13) Women's economic rights (CIRI 2009), 14) Women's social rights (CIRI 2007), 15) Proportional salary of women in manufacturing (UN 2003), 16) Genital mutilation (UNICEF 2004), 17) Proportion female/male suicide (WHO 2007), 18) Maternity pay in percentage of salary (UN 2010), 19) Legal age of marriage of females relative to males (UN 2008), 20) Mother Index (STC 2010), 21) Women's index (STC 2010), 22) Unemployed women to men (UN 2008).

9. CHILDREN'S WELL-BEING

Variables: 1) Mortality before age 5 (FPRI 2010), 2) Childhood mortality (UNICEF 2007), 3) Mortality before age 5 (UN-WPP 2010), 4) Percent of children underweight (IFPRI 2008), 5) Legal age of marriage of males (UN 2008), 6) Legal age of marriage of females (UN 2008), 7) Children Index (STC 2010), 8) Child labor (UNICEF 2003), 9) Orphans (UNICEF 2003), 10) Child marriage (UNICEF 2003).

10. RELIGIOUS FREEDOM

Variables: 1) Social regulation of religion (IRFR USSD 2005), 2) Religious hostilities index (PRC 2009), 3) Religious freedom (CIRI 2009), 4) State religion (Barro & McCleary, 2005), 5) Religious restrictions index (PRC 2009), 6) Social regulation of religion (IRFR USSD 2003), 7) Government regulation of religion (IRFR USSD 2005).

11. PACIFISM

Variables: 1) Peace index (EIU 2010), 2) Percent of GDP devoted to military (CIA Factbook 2010), 3) Military might (EIU 2007), 4) Percent of government expenditures on defense (UNICEF 2003), 5) Date joined UN, 6) UN Blue Hats contributed in proportion to population (UN 2011), 7) Membership in international governmental organizations (INSCR 1997), 8) Armed conflicts (INSCR 2009), 9) Percent of population who are military (SIPRI 2008).

12. PERMISSIVE CULTURE

Variables: 1) Free press rating (FH 2002), 2) Liberty Index (STWP 2009), 3) Right to physical integrity (CIRI 2009), 4) Torture (CIRI 2009), 5) Freedom of foreign movement (CIRI 2009), 6) Freedom of speech (CIRI 2009), 7) Incarceration rate (UN-DP 2007), 8) Freedom on the internet (FH 2010), 9) Freedom of domestic movement (CIRI 2009), 10) Repression by the state (INSCR 2009).

13. POLITICAL FREEDOM

Variables: 1) Free elections ranking (EIU 2007), 2) Democracy Index (EIU 2010), 3) Political prisoners (CIRI 2009), 4) Democratic elections (CIRI 2009), 5) Independent judiciary (CIRI 2009), 6) Ethnic representation in the political arena (INSCR 2009).

14. STATESMANSHIP

Variables: 1) Index of poor governance (CIFP 2007), 2) Environmental sustainability index (WEF 2010), 3) Resistance to corruption (CIT-TI 2007), 4) Ease of doing business (WB 2010), 5) Empowerment (CIRI 2009), 6) Political stability (INSCR 2009) 7) Type of state (monarchy vs. parliament) (Wikipedia 2007).

15. VALUE OF HUMAN LIFE

Variables: 1) Suicide rate (WHO 2007), 2) Suicide rate (Suicide.Org 2010), 3) Abortion rate (Johnson, 2008), 4) Date capital punishment abolished (AI 2010), 5) Killings (CIRI 2009), 6) Assassinations (CIRI 2009), 7) Disappearances (CIRI 2009), 8) Murder rate (UN 2004), 9) Homicide rate (Wikipedia 2010), 10) Abortion rate (UN 2007),11) Terrorism (INSCR 2002), 12) Homicide rate (UNODC 2010).

16. PROPHYLAXIS

Variables: 1) Alcohol consumption (WHO 2005), 2) Non zoonotic parasite stress (Fincher & Thornhill, 2008), 3) Opiate use (UNODC 2010), 4) HIV infection rate (CIA Factbook 2011), 5) HIV infection rate (CIA Factbook 2009), 6) Percent who smoke (WHO 2002), 7) HIV infection rate (UNICEF 2003), 8) Robberies (UNODC 2010).

Statistical approach

Two statistical approaches were used in this report. Non parametric univariate analysis (Kendall's Tau-B coefficient) compared all variables after conversion to ranks. It represents a conservative, rigorous and transparent test of methodological questions and of the mini-models outlined above. To interpret those results, multivariate and parametric analysis pursued a modest exploratory (heuristic) goal of data reduction and control of collinearity.

Results

Methodological issues

Are cross-national measures of religiosity and secularity opposites? Considering that the terms "religiosity" and "secularity" are antonyms, correlations between the two should be strongly negative. The five (ranked) measures of religiosity and secularity were all significantly intercorrelated in the expected directions (r = .435, $p < .001$). The strongest correlation between any two distinct data collection agencies was between "Importance of religion Gallup 2010" and "Importance of God WVS 2002" (r = .803, $p < .001$).

Both Gallup (r = -.962, $p < .001$) and WVS (r = -.818, $p < .001$) yield very high negative correlations between their measures of religiosity and secularity. While this result makes intuitive sense

it is not a given. If religiosity and secularity are considered on the basis of belief then we have to consider that while "non-belief" is unequivocal, "belief" is heterogeneous between and within religions. This problem is overcome in the two cross-national surveys, however, by operationalizing religiosity through degrees of attachment to religion, thus not touching upon the complexity or diversity of religious beliefs. A universally valid construct of religiosity actually exists in cross-national statistics if one looks at degrees of attachment to religion. Thus, any measure of religiosity or secularity will be considered analogous, with close attention to signs of correlates.

Are cross-national measures of religiosity and secularity reliable and valid? There are several kinds of reliability. Cross-national measurement of religiosity/secularity is subject to the same criteria for reliability as are measures within a country. One would expect cross-national measurement to manifest statistically significant stability, but if that stability were absolute, there would be no point in measuring the phenomenon over time. The religiosity/secularity of nations has changed throughout history, sometimes very drastically over a few generations, and especially recently (Jenkins, 2006). On the other hand, no evidence to date suggests drastic changes in religiosity/secularity over a single year in any one nation. Thus evidence from a cross-national survey of relatively stable religiosity/secularity measures from one year to the next should indicate some degree of survey reliability.

Gallup conducted a survey of religiosity in various countries around the world in 2009 as well as in 2010.The distributions of these two measurements were both far from normal (Kolomogorov-Smirnov index = .183 and .179, df = 141, $p < .001$). The ordinal Kendall's Tau-B correlation between these two measurements was $r = .995$, $p < .001$, indicating significant and substantial stability of the measurement at retest and attesting to the fact that measurement error is likely very low.

Construct validity also warrants consideration. Construct validity is concerned with the extent to which measures actually measure what they purport to, by specifically focusing on convergent validity or the degree of interrelation between phenomena that should theoretically be related. Short statements of beliefs should be strongly related to self-reported behaviors because that would demonstrate them to be coherent and thus that much more plausibly truthful and meaningful. The data in the WVS supports this, as church attendance correlates highly with intensity of religious belief (WVS: $r = .727$, $p < .001$). In the present study the construct "Importance or unimportance of religion" is strongly correlated with many other aspects of religiosity, including intensity of feelings of religion's importance, degree of personal commitment in time to religion, commitment to a community, and depth of religious belief. Some of these measures of religiosity could be unrelated statistically, but that is not the case, suggesting that these types of survey questions used to quantify religiosity are meaningful.

It cannot be assumed that cross-national analysis is representative of the entire world population or all geographic regions. Cross-national distributions can be tainted by either population count or country surface. If religiosity/secularity variables are not correlated with such variables then that would provide a good basis for supposing that cross-national analysis is not distorted in these important respects. Population count is of particular importance because even though it is never mentioned in cross-national analyses, what is really sought is the most balanced worldwide sampling possible. Correlations between religiosity/secularity variables of the present study and country surface or population count per country (or a combination of the two) fell far short of significance more often than not. While there was a trend for more populous countries to be more religious in terms of "importance of God" (WVS: $r = .191$, $p = .022$) and "church attendance" (WVS: $r = .203$, $p = .015$), the three other indicators of religiosity/secularity were not significantly correlated with population count. There was also a trend for countries with greater territories to be more religious in terms of "importance of God"

(WVS: r = .172, p = .038), but the four other indicators of religiosity/secularity were not significantly correlated with country surface. Altogether, cross-national sampling of religiosity is slightly distorted with regard to what would be observed if sampling were "country neutral," but this does not appear to be a serious concern, especially with regard to more recent and larger samples. Basically, these modest sampling distortions suggest that cross-national statistics relating religiosity/secularity to any other variable are slight underestimates of what would be obtained were individual people of the entire world sampled with the world as a single unit.

Theoretical issues

What are the strongest non-subjective cross-national correlates of religiosity and secularity? Since the vast majority of cross-national statistics were not normally distributed, all univariate correlational analyses were done, as above, supposing no more than ordinality, not normality. Ordinal correlation coefficients (Kendall's Tau-B) between religiosity/secularity variables (transformed to ranks) and other cross-national statistics (transformed to ranks) were placed into tables according to the following rule: The highest correlation (effect size) obtained between any non psychological cross-national variable and any cross-national religiosity/secularity variable was placed in the first row in tables. Correlations of a predictor with any of the four other criteria (indicators of religiosity) were excluded from the table. The next highest appropriate correlate was placed in the next row, and so on.

Finally, the reader is advised that cross-national statistics are treacherous for statistical analysis. Most unambiguously quantify some intuitively palpable phenomenon (mean birth rate, gross national product per capita, etc.). However, some are formatted as ranks wherein the lowest value most represents what the variable is named for and the highest value represents what people would interpret as its opposite. The variable's name, which is often a widely used label for that concept, can be erroneously interpreted as the opposite of what it actually quantifies, especially in correlational analyses where readers and analysts are used to paying attention to valences of correlation coefficients. For example, if countries are ranked for so-called "literacy", then the most literate country would get a rank of one. Higher numbers would then actually correspond to lower literacy. Such variable names are incongruent with their quantitative implementation. To avoid confusion in the present report, the databases' names, formulated by the data collection agencies themselves, were maintained. In all the text that precedes and follows, and in all the tables that follow, the following strategy was adopted: only the concept signified by the variable's name is to be considered, not the quantitative nature of the distribution characterizing it. Thus, all correlations have been given the sign (negative or positive valence) that reflects what is suggested by the variable's name. In addition, Table 2 describes unexpected results in a succinct and precise manner (see the notes at the end of the Table for further details).

What can be gleaned from Table 1? Did these 149 correlates of religiosity, on a cross-national basis from data collected in the first decade of the third millennium, replicate and extend the mini-models derived from data collected during the 90s (reviewed in the introduction)? Careful inspection of this table reveals that placing highly diverse variables into theoretical models, a priori, is complex. Not too surprisingly, variables within mini-models did not neatly aggregate together in their ability to predict religiosity/secularity, making these findings hard to integrate in light of the mini-models outlined in the introduction.

Table 1. Associations between cross-national compilations of non-subjective phenomena and religiosity/secularity (r, p and N)

Non-subjective variable	Religiosity/secularity variable most correlated	r	p	N
Percent adults who can read 2008	Weekly church attendance 2007	- .648	.000	48
Percent adults who can read 2007	Weekly church attendance 2007	-.611	.000	47
Global Education Index 2007	Importance of religion 2010	-.603	.000	136
Mortality before age 5 2010	Church attendance 2007	.603	.000	41
Global mortality 2011	Importance of religion 2010	.551	.000	151
Percent with higher education 2010	Importance of religion 2010	-.545	.000	123
Childhood mortality 2007	Importance of religion 2010	.545	.000	138
Fertility 2005	Importance of religion 2010	.533	.000	141
Mortality before the age of 5 years 2010	Importance of religion 2010	.533	.000	140
Maternal mortality at childbirth 2010	Importance of religion 2010	.531	.000	140
Internet users 2010	Importance of religion 2010	-.526	.000	139
Televisions per capita 2011	Importance of religion 2010	-.525	.000	136
Internet per capita 2008	Unimportance of religion 2010	.523	.000	142
Life expectancy 2007	Importance of religion 2010	.514	.000	138
Alcohol consumption 2005	Unimportance of religion 2010	.514	.000	140
Fertility 2010	Importance of religion 2010	.513	.000	141
Womens economic rights 2009	Unimportance of religion 2010	.511	.000	140
Non zoonotic parasite stress 2011	Importance of religion 2010	.504	.000	81
Proportion of women over men who can read 2007	Unimportance of religion 2010	.494	.000	108
Percent with drinking water 2002	Importance of religion 2010	-.490	.000	116
Purchasing power 2010	Importance of religion 2010	-.489	.000	139
Purchasing power 2008	Importance of religion 2010	-.489	.000	141
Womens' social rights 2007	Unimportance of God 2007	.486	.000	63
Multi dimensional poverty index 2008	Importance of religion 2010	.485	.000	91
Suicide 2010	Unimportance of God 2007	.484	.000	81
Life expectancy of women over men 2007	Church attendance 2007	-.480	.000	66
Political prisoners 2009	Unimportance of God 2007	-.480	.000	67
Life expectancy 2010	Importance of religion 2010	-.478	.000	139
Percent children underweight 2008	Weekly church attendance 2007	.476	.000	41
Access to contraception 2008	Importance of religion 2010	-.473	.000	134
Gross national income per capita 2007	Importance of religion 2010	-.472	.000	133
Index of poor governance 2007	Percent without religion 2011	-.470	.000	185
Date women obtained vote2011	Importance of religion 2010	.465	.000	141
Free elections ranking 2007	Unimportance of religion 2010	.463	.000	132
State repression 2009	Unimportance of God 2007	-.462	.000	64
Persons per room 2010	Percent without religion 2011	-.462	.000	53
Democracy index 2010	Unimportance of religion 2010	.461	.000	139
Access to water 2000	Importance of religion 2010	-.451	.000	110
Academic productivity 2009	Unimportance of religion 2010	.455	.000	119
Status of women index 2010	Unimportance of religion 2010	.453	.000	115
Freedom of speech 2009	Without religion 2007	.450	.000	189
Contraception 2010	Unimportance of religion 2010	.447	.000	136
Environmental sustainability index 2010	Unimportance of religion 2010	.447	.000	135
Networked readiness index 2007	Importance of religion 2010	-.445	.000	109
Liberty Index 2009	Percent without religion 2011	.442	.000	185
Telephones per capita 2008	Importance of religion 2010	-.441	.000	139
Right to physical integrity 2009	Importance of God 2007	-.439	.000	67

Note. Each non-subjective variable or "predictor" was significantly correlated with all five indexes of religiosity/secularity or "criteria". For each predictor, only the relation with the highest effect size (r) is presented here. See the Methods section, Table 2 and the appendix for more information about sources of the databases.

Table 1 (continued). Associations between cross-national compilations of non-subjective phenomena and religiosity/secularity (r, p and N)

Non-subjective variable	Religiosity/secularity variable most correlated	r	p	N
Books per capita 2008	Church attendance 2007	-.435	.000	45
Democratic elections 2009	Unimportance of God 2007	.433	.000	67
Killings 2009	Importance of God 2007	.432	.000	67
Hunger 2008	Importance of religion 2010	.431	.000	101
Adolescent fertility 2009	Unimportance of God 2007	-.431	.000	67
Absence of peace index 2010	Unimportance of God 2007	.427	.000	65
Empowerment 2009	Without religion 2007	.425	.000	190
Adolescent fertility 2010	Unimportance of God 2007	-.422	.000	67
Workers rights 2009	Unimportance of God 2007	.422	.000	67
Free press rating 2002	Without religion 2007	.421	.000	181
Suicide rate 2007	Importance of religion 2010	-.417	.000	83
Resistance to corruption 2007	Without religion 2007	.412	.000	176
Assassinations 2009	Without religion 2007	-.412	.000	189
Percent population with sanitation 2002	Unimportance of religion 2010	.416	.000	110
Ease of doing business 2010	Unimportance of religion 2010	.409	.001	141
Days of maternity leave2010	Unimportance of religion 2010	.404	.000	136
Armed conflict	Unimportance of God	-.398	.001	64
Percent receiving a polio shot 2003	Importance of religion 2010	-.386	.000	138
Percent living on one dollar a day 2003	Importance of religion 2010	.386	.000	92
Purchasing power of richest 10 percent 2002	Church attendance 2007	.383	.000	53
Quality of health system 2000	Importance of religion 2010	-.382	.000	135
Intensity of deprivation 2008	Importance of religion 2010	.380	.000	87
Percent receiving DPT3 shot 2003	Importance of religion 2010	-.377	.000	138
% of GDP spent on public education 2007	Importance of religion 2010	-.374	.000	73
Female to male secondary education 2010	Importance of religion 2010	-.373	.000	126
Percent receiving measles shot 2003	Importance of religion 2010	-.369	.000	139
Proportion GDP for public health 2009	Unimportance of religion 2010	.367	.000	138
Percent women managers, legislators 2010	Without religion 2007	.367	.000	111
Ratio of men to women 2011	Importance of God 2007	.358	.000	68
Inequality of purchasing power 2007	Unimportance of God 2007	-.354	.000	61
Percent receiving a TB Shot 2003	Importance of religion 2010	-.353	.000	117
Abortion 2008	Importance of religion 2010	-.347	.000	69
Proportion GDP for education2007	Church attendance 2007	-.345	.000	50
Torture 2009	Importance of God 2007	.341	.000	67
Religious hostilities index 2009	Importance of God 2007	.339	.000	66
Freedom of foreign movement 2009	Importance of God 2007	-.339	.000	67
Legal age of marriage of men 2008	Importance of God 2007	-.336	.000	62
Religious freedom 2009	Importance of God 2007	-.327	.000	67
Date capital punishment abolished 2010	Unimportance of God 2007	-.323	.000	64
Economic inequality Gini 2012	Unimportance of God 2007	-.322	.000	64
Social regulation of religion 2005	Importance of God 2007	.318	.000	65
Legal age of marriage of fem. relative to mal. 2008	Importance of God 2007	.300	.000	60
Independent judiciary 2009	Unimportance of religion 2010	.278	.000	141
% government expenditure on education 2003	Unimportance of God 2007	.275	.000	62
Disappearances 2009	Unimportance of God 2007	-.274	.005	67
Female to male parliamentarians 2010	Importance of God 2007	-.252	.003	67
Use of opiates 2010	Importance of religion 2010	-.244	.000	108

Note. Each non-subjective variable or "predictor" was significantly correlated with all five indexes of religiosity/secularity or "criteria". For each predictor, only the relation with the highest effect size (r) is presented here. See the Methods section, Table 2 and the appendix for more information about sources of the databases.

As a consequence, it was thought judicious to regroup the findings of Table 1 in a manner optimizing or at least facilitating comparison of the mini-models. Table 2 thus summarizes and organizes the most highly significant and robust findings of the present study. There are five principles of organization of Table 2: 1) The mini-models are ranked in decreasing order of credibility as a function of the effect size of their highest correlate; 2) Within each mini-model, the predictors are ranked in decreasing order of effect size. The reader is advised that each predictor would appear five times in that table if each of its (significant) correlations with religiosity/secularity were included. In fact, only the highest correlate between any predictor and the five criteria was included in Table 2, as in Table 1; 3) All results opposed to the secularization-by-successful-modernity concept are marked with an asterisk; 4) Readers preoccupied with worldwide representativeness of the findings ought to focus on those predictors placed in italics: each italicized term is the predictor drawn from the largest sample in the mini-model; 5) Finally, readers preoccupied with the robustness of replication of findings from independent sources ought to focus on the statements in parentheses. These indicate the number of tests run in each model as well as the number of these tests having passed the stringent inclusion criterion (significant correlation with all five indicators of religiosity/secularity).

In Table 2, fourteen of the 16 “mini-models” formulated in the introduction passed two strict criteria of veridicity at this first stage of statistical analysis: 1) they had at least three non-subjective variables that were significantly correlated with all five indexes of religiosity/secularity in the direction predicted by the general secularization-by-successful-modernity concept; 2) there were no significant counter-results within the mini-model. The PROPHYLAXIS model tended to contradict the general secularization-by-successful modernity concept. The VALUE OF HUMAN LIFE model respected the first criterion of veridicity but not the second.

Heuristic and interpretive issues

To what extent are the variables of the present study collinear? There is one general model of religiosity/secularity which holds currency today, the Existential Security Framework (Norris & Inglehart, 2004), although it is not without competition from the several empirically supported “mini-models” discussed in the introduction. However, it is not known to which extent variables within these mini-models are intercorrelated nor the extent to which the mini-models might themselves be correlated. Interpretation of long lists of univariate inference tests is very limited without the application of data reduction techniques, verification of collinearity of predictors criteria, or both. The highest correlate of Table 1 does not significantly differ from the next highest, and so on. So there is no unequivocal evidence from univariate analysis that any mini-model provides a substantially better “fit” than the others. Thus, in order to further exploit the rich data of Tables 1 and 2, it will be useful to devise a multivariate approach for data reduction and for control and/or inspection of collinearity.

Cross-national data present many obstacles for multivariate analysis: sample sizes vary tremendously, coverage is not the same from one survey to another, and distributions are very far from normal. To address these problems, it was first resolved to continue using only data transformed to ranks. This brings the distributions much closer to normality. Secondly, it was resolved to ignore, for purposes of multivariate analysis, the two mini-models with contradictory results (the VALUE OF HUMAN LIFE and PROPHYLAXIS models). Thirdly, it was resolved to select from Table 1 as an exemplar of each mini-model, the predictor drawn from the largest sample (placed in italics in Table 2). With this approach, the variable with the smallest sample comprised 136 countries.

Table 2. Ranking of theoretical models (capital letters) by the effect size of the highest correlate within each model.

1. FORMAL EDUCATION: 1) **Percent adults who can read 2008**, 2) Percent adults who can read 2007, 3) *Global education index 2007*, 4) IQ 2006, 5) Percent with higher education 2010, 6) Academic productivity 2009, 7) Books per capita 2008 (7/8 predictors retained)

2. CHILDREN'S WELLBEING: 1) **Mortality before age 5 2010**, 2) *Childhood mortality 2007*, 3) Mortality before age of 5 years 2010, 4) Percent of children underweight 2008, 5) Legal age of marriage of males 2008 (5/10 predictors retained)

3. HIGH LIFE EXPECTANCY: 1) ***Global mortality 2011***, 2) Life expectancy 2007, 3) Life expectancy 2010, 4) Quality of health system 2000 (4/4 predictors retained)

4. LOW BIRTH RATE: 1) **Fertility birth rate 2005**, 2) *Fertility 2010*, 3) Adolescent fertility 2009, 4) Adolescent fertility 2010 (4/6 predictors retained)

5. GENDER EQUALITY: 1) **Maternal mortality at childbirth 2010**, 2) Proportion of women over men who can read 2007, 3) Women's economic rights 2009, 4) Womens social rights 2007, 5) Life expectancy of women over men 2007, 6) Access to contraception ranking 2008, 6) Date women obtained vote 2011, 8) Status of women index 2010, 9) Contraception 2010, 10) Days of maternity leave 2010, 11) Percent women managers, legislators, officials 2010, 12) Female to male secondary education 2010, 13) *Ratio of men to women 2011*, 14) Legal age of marriage of females relative to males 2008, 15) Female to male parliamentarians 2010 (15/22 predictors retained)

6. INFORMAL EDUCATION: 1) ***Internet users 2010***, 2) Televisions per capita 2011, 3) Internet per capita 2008, 4) Networked unreadiness index 2007, 5) Telephones per capita 2008 (5/5 predictors retained)

7. PROPHYLAXIS: 1) **Alcohol consumption 2005***, 2) Non zoonotic parasite stress 2011, 3) Use of opiates 2010* (1/8 predictors retained)

8. WEALTH/ECONOMIC DEVELOPMENT: 1) **Percent with Drinking Water 2002**, 2) Purchasing power IMF 2010, 3) *Purchasing power CIA 2010*, 4) Multidimensional poverty index 2008, 5) Gross national income per capita 2007, 6) Persons per room 2010, 7) Hunger 2008, 8) Percent with Sanitation 2002, 9) Percent of population living on less than a dollar a day 2003, 10) Intensity of deprivation 2008 (10/18 predictors retained)

9. VALUE OF HUMAN LIFE: 1) **Suicide rate 2010***, 2) Killings CIRI 2009, 3) Suicide rate 2007*, 4) Assassinations 2009, 5) Abortion 2008, 6) Date capital punishment abolished 2010, 7) Disappearances 2009 (5/12 predictors retained)

10. POLITICAL FREEDOM: 1) ***Political prisoners 2009***, 2) Free elections ranking 2007, 3) Democracy Index 2010, 4) Democratic elections 2009, 5) Independent judiciary 2009, 6) Ethnic representation in the political arena 2009 (6/6 predictors retained)

11. STATESMANSHIP: 1) **Index of poor governance 2007**, 2) Environmental sustainability index 2010, 3) Resistance to corruption 2007, 4) *Empowerment 2009*, 5) Ease of doing business 2010 (5/7 predictors retained)

12. PERMISSIVE CULTURE: 1) **Repression by the state**, 2) Freedom of speech 2009, 3) Liberty Index 2009, 4) *Right to physical integrity 2009*, 5) Free press rating 2002, 6) Liberty Index 2009, 7) Torture 2009, 8) Freedom of foreign movement 2009 (8/10 predictors retained)

13. PACIFISM: 1) **Peace index 2010**, 2) *Armed conflict 2009*, (2/9 predictors retained)

14. STATE PROVIDED SECURITY: 1) ***Workers rights 2009***, 2) Percent of infants receiving polio vaccine 2003, 3) Percent of infants receiving DPT3 vaccine 2003, 4) Percent of infants receiving measles vaccine 2003, 5) Percent of infants receiving tuberculosis vaccine 2003, 6) Proportion GDP for public health 2009, 7) Proportion GDP for education 2007, 8) Percent of government expenditures spent on education 2003 (8/13 predictors retained)

15. ECONOMIC EGALITARIANISM: 1) **Percent of GDP of the richest 10 Percent 2002**, 2) Inequality of purchasing power 2007, 3) *Gini index of inequality 2012* (3/4 predictors retained)

16. RELIGIOUS FREEDOM: 1) **Religious hostilities index 2009**, 2) *Religious freedom 2009*, 3) Social regulation of religion 2005 (3/7 predictors retained)

Note. * indicates that the valence of the correlation was not in the direction predicted by the general secularization-by-modernity concept. All the non-subjective measures (predictors) in this table were correlated significantly with all five measures of religiosity/secularity (criteria). See the Methods section. The MINI-MODELS are ranked by the effect size of their best prediction (effect size). The correlates within each model are ranked in decreasing order of effect size with the highest effect size in each model in bold character: this predictor is termed the ***flagship*** for each model. See the Introduction and Methods sections for sources of the databases. Within each theoretical model the coefficient involving the predictor with the largest sample is placed in *italics*. Each such variable is to be used for multivariate data reduction and hypothesis testing in the next section. The number of initial predictors planned for the tests within a mini-model is provided in (parentheses) as well as the number of these planned tests having met the inclusion criterion (significant correlation with all five indicators of religiosity/secularity in the direction expected from the idea of secularisation by successful modernity).

A data reduction analysis was run to determine whether there are aggregates of mini-models or whether all the models are basically measuring the same thing. Accordingly, a principal components analysis was carried out on 14 variables, one from each mini-model. The criterion for selecting the predictor within the mini-model was that it had to have the largest sample (see Table 2). The default values of the principal components procedure were retained. No rotation was attempted. Listwise deletion was applied leaving 124 countries with no missing data. The principal components analysis settled to a three factor solution. The three factor score distributions were uncorrelated ($r = .033$, $p > .585$).

The first factor explained 53% of the variance: its factor scores correlated with all 14 variables significantly ($r > .232$ $p < .05$). The four most important contributors to this first factor, in decreasing order of importance were: Global Mortality, Child Mortality, Education Index, and Purchasing Power. This factor could be named "material/intellectual wealth". The second factor explained 15% of the variance: only seven variables correlated as much as the weakest correlate above with the factor scores. The four most important correlates, in decreasing order of importance were: Religious freedom, Empowerment, Workers rights and Political prisoners. This factor could be named "liberty/justice". The third factor explained 7% of the variance. Only four variables correlated significantly with the factor scores: Inequality of purchasing power 2012, Ratio of men to women, Armed conflict, Religious freedom and Purchasing power. This factor could be named "inequality/conflict". See Table 3 for the factor loadings.

Table 3. Component matrix of the principal components analysis (loadings of the variables onto the components or factors)

Variables	Component		
	1	2	3
Rank of Global Education Index UN 2007	.884	-.251	.088
Rank of Childhood Mortality UNICEF 2007	-.921	.279	-.151
Rank of Global Mortality CIA 2011	-.930	.229	-.139
Rank of Fertility CIA 2010	-.830	.375	.053
Rank of Ratio Men To Women CIA 2011	-.455	.072	.481
Rank of Internet Users WB 2010	.855	-.258	.271
Rank of Purchasing Power CIA 2008	.870	-.230	.265
Rank of Political Prisoners CIRI 2009	-.686	-.469	.117
Rank of Empowerment CIRI 2009	.721	.541	.144
Rank of Right To Physical Integrity CIRI 2009	.800	.335	-.104
Rank of Armed Conflicts INSCR 2009	-.535	-.300	.299
Rank of Worker Rights CIRI 2009	.507	.482	-.253
Rank of Inequality Of Purchasing Power Gini CIA 2012	-.480	.348	.574
Rank of Religious Freedom CIRI 2009	.376	.782	.252

The factor scores of the first factor correlated highly with Gallup's "importance of religion" ($r = -.61$, $p < .001$). The factor scores of the second factor did not correlate significantly with Gallup's "importance of religion" ($r = .07$, $p = .277$). The factor scores of the third factor also did not correlate with Gallup's "importance of religion" ($r = .008$, $p = .901$). It appears that though the predictors of religiosity/secularity selected for the present study actually do comprise several dimensions, just one of these dimensions relates to religiosity/secularity. The first dimension exhibits a strong, statistically signficant correlation with all 14 predictors. On the basis of this principal components analysis, and

subsequent univariate correlations, “material/intellectual wealth” seems to form an aggregate explaining most of the variance in the predictor set. This aggregate is also capable of explaining 53% of the religiosity/secularity variance indicating that one should be wary of attaching too much importance or specificity to any of the other mini-models outlined in the introduction or championed by others. However, this principal components analysis dealt only with a subset of predictors of religiosity/secularity. Things could change dramatically were the religiosity/secularity dimension introduced directly into the multivariate analysis.

The next analysis consisted of using multiple regression to determine whether any mini-model or sub-set of mini-models seems to provide a unique ability to predict religiosity/secularity. The same 14 predictor variables as described above were included. Gallup’s 2010 importance of religion was selected as the criterion because the sample is much larger than the one provided by the World Value Survey. Stepwise regression was used to determine which of the 14 predictors explained the most variation as a function of their predictive power (R^2) and statistical significance (Table 4). Cases (i.e., countries) with missing values were deleted. The stepping method for Entry ($p = .05$) and for Removal ($p = .10$) was left at the default settings of SPSSv18. There were 114 countries without any missing data. The procedure settled upon three models in decreasing order of statistical significance and in increasing order of predictive power (R^2). The first model retained only the Education Index as a predictor. The second model retained the former as well as Fertility. The third model included the former two predictors as well as Worker rights.

The first model presented no problem of collinearity of course, since it retained only one predictor. The second and third models presented acceptable levels of multivariate collinearity, an unsurprising finding considering that the stepwise multiple regression procedure of SPSS includes inclusion/exclusion algorithms pertaining to collinearity. See Table 4.

There are two major conclusions that can be drawn from this particular analysis. First, there is one and only one mini-model that can be claimed to distinctly explain religiosity/secularism, namely formal education. The relevant single predictor, “Rank of Global Education Index UN 2007” correlated more significantly and more distinctly with the criterion “Importance of religion” than any other predictor, as determined by stepwise multiple regression. It even correlated more significantly than any other predictor (Table 4). Second, on the basis of this stepwise multiple regression analysis, just three mini-models suffice to explain most of the religiosity/secularity variance. Impressively, with only three predictors (i.e., the third model), 70% of religiosity variance was explained, with adjustment for shrinkage. This third model exhibited significant improvement over the two-variable model ($F = 226$, $p < .001$), indicating that objective living conditions are important determinants of religiosity. Of note, none of the indicators most relevant to the *Existential security framework* were retained. This profile is all the more credible considering that the three predictor model presents no problem of collinearity.

Table 4. Stepwise regression results of Rank of Religion's Importance (Gallup 2010) on 14 predictor variables.

	Model 1				Model 2				Model 3			
	b (std. error)	β	p	collin. tolerance	b (std. error)	β	p	collin. tolerance	b (std. error)	β	p	collin. tolerance
Rank of Global Education Index UN 2007	-0.635 (0.04)	-0.817	.000	1.000	-0.480 (0.07)	-0.617	.000	0.345	-0.436 (0.07)	-0.561	.000	0.326
Rank of Fertility CIA 2010					0.018 (0.07)	0.247	.007	0.345	0.185 (0.06)	0.258	.004	0.345
Rank of Worker Rights CIRI 2009									-0.122 (0.05)	-0.140	.012	0.886
Constant	127.330 (4.55)		.000		96.770 (11.96)		.000		104.160 (12.03)		.000	
R2	0.667				0.688				0.705			
F	226.194		.000		123.439		.000		88.590		.000	

Note. Because this stepwise multiple regression analysis was run exclusively on variables previously transformed to ranks, the various forms of beta coefficients are not outstandingly important to consider. They remain relevant to the extent that the ranks vary from variable to variable because they are not derived from the same sample of countries in each case. The Variance inflation factor (VIF) is 1/tolerance. Tolerance is an estimate of multivariate collinearity. The most common rule of thumb for unacceptable tolerance is an index below .20

Discussion

The cross-national indexes of religiosity/secularity investigated here were drawn from two distinct sources: Gallup and the World Values Survey. The religiosity measures of the present investigation were highly positively intercorrelated, while religiosity and secularity measures were highly negatively correlated. Repeated measures were highly correlated. Ratings of intensity of belief correlated highly with statements about intensity of religious practice. Finally, territorial surface and population count of countries were not substantially related to religiosity/secularity variables, suggesting that cross-national analysis of religiosity/secularity is not unduly influenced by such sampling distortions.

It is appropriate to continue thinking about religiosity/secularity based on cross-national research in general terms: the progression of secularity is related to successful modernity as a whole, not just wealth and security. There is at present only one established general model of religiosity/secularity based on cross-national analyses and that is the Existential Security Framework (ESF) of Norris & Inglehart (2004). The word "existential" in the ESF model signifies a relation to survival (i.e., existing versus not existing). The word "security" in ESF signifies the likelihood of survival. The ESF model is thus very concrete. If the present investigation had limited itself to a review of univariate cross-national correlates of religiosity/secularity and parameters most relevant to the ESF general model, then the conclusion would have been straightforward support of, or even fortification, of that model. Indeed, ten distinct indicators of material wealth were significantly correlated with all five of the measures of religiosity/secularity. Eight indicators of state-provided material security also correlated significantly, as did four indicators of life expectancy and three indicators of economic egalitarianism. These findings, taken in isolation, support and reinforce the Existential Security Framework (ESF) of Norris & Inglehart (2004).

However, the present investigation demonstrates that wherever modernity is generally successful, secularity flourishes. This investigation not only replicates and extends the findings of Norris & Inglehart (2004), it replicates, reinforces and extends other models stemming from the analyses of univariate, cross-national correlates of religiosity/secularity since 2004. All the "mini-models" of secularization theory outlined in the introduction were strongly and convincingly supported and extended at the univariate level – except the PROPHYLAXIS model which was rejected, and the VALUE OF HUMAN LIFE model, which was supported but not unequivocally.

Ninety variables (listed in table 1) out of 149 entry variables expected to predict religiosity/secularity and supported secularity as an accompaniment of successful modernity. Only four variables, of the initial 149 predictors, correlated significantly with religiosity/secularity in a manner contrary to the general "secularisation-by-modernity" principle. The possibility of this general principle not being true based on the criticism or claim that researchers have "cherry-picked" predictor variables no longer seems plausible.

However, the present investigation was not limited to variables relevant to the ESF. Many other variables relevant to alternative explanations were included here. Viewed with such a wide lens, the ESF model was supported, but it should no longer be seen as the most general theoretical model. More specifically, it seems as though existential security is not the primary force advancing secularity around the world today. The ensemble of findings of the present investigation suggest that the primary force is formal education. The highest correlate of religiosity/secularity in the entire data base is a measure of formal education. Four of the six highest correlates are measures of formal education, and these correlates come from a diversity of sources. Finally, formal education survived stepwise multiple

regression but the direct indicators of "material security" did not.

Things seem to have changed since cross-national statistics started to be applied to religiosity/secularity. Nearly all the effects reviewed in the introduction were from data collected in the 1990s whereas nearly all the data of the present report were collected during the third millennium. The findings of the present investigation are also not fully compatible with the Existential Security Framework (Norris & Inglehart, 2004).

To what extent have cross-national correlates of religiosity/secularity shifted in the last eight years, i.e., since Norris and Inglehart (2004)? While formal education was empirically important in previous investigations it did not stand out. For example, Norris & Inglehart (2004) used the 1980-2001 WVS survey (which included just 73 nations). They found that indexes of demographics, health and socioeconomic development were all slightly more correlated with religiosity than the 1998 UN index of literacy, the updated version of which is the highest correlate in the present investigation. This discrepancy does not seem to be caused by the differences in the quantity of countries covered: in the present investigation; the 2002 WVS religiosity index correlated with "Percent adults who can read UNESCO 2008" at r = -.628. To be more precise, formal education is not any more correlated with secularism in the present investigation than it was in Norris & Inglehart (2004). It is the same. Rather, other correlates (demographics, health and socioeconomic development) are now weaker correlates than in Norris & Inglehart (2004). The most recent investigation of cross-national statistics in relation to religiosity/secularity is that of Barber (2011). In Barber's study, state welfare, economic egalitarianism, pathogen load, tertiary education and secularity were investigated with a sample of 137 countries. Education was the highest correlate of secularity (r = .71). Even though Barber (2011) did not make this particular point in his analysis, it appears that there has been a shift over the last decade in the topography of cross-national correlates of religiosity/secularity.

Could this shift be a mere artifact of the databases used here? That does not appear likely. The same phenomenon is being observed in within-country sampling. Increasing levels of scientific education within nations correlate with a dramatic increase in secularity. Braun (2011) analyzed over a million biographic profiles publicly displayed on an internet social club in Quebec, Canada, named *Réseau Contact*. He found that the 32,704 atheists in the database had a much higher income than the 177,172 Catholics in the database (Chi-square = 483). However, the higher education of the atheists was far more significant (Chi-square = 10,119). General level of education is by far the most powerful predictor of degree of religiosity in those countries where research is carried out on that subject (Albrecht & Heaton, 1984). Scientific education, specifically, seems to operate as a unique and completely sufficient cause of secularity, statistically speaking. Members of national scientific associations, i.e., professional researchers, are secular in large majorities; 78.8 % of the members of Britain's Royal Society were nonreligious in 2006 (results summarized by Dawkins, 2006). According to Larson and Witham (1998), of the American scientists elected to the National Academy of Sciences, only about 7% believed in a personal God in 1998. According to Beit-Hallami (1988), only one of 700 Nobel Prize winners in science is known to believe in a personal God. No other variable is as powerful a correlate of secularity, at the individual (or within-country) level, than scientific education. Wealth, for example, is not nearly as strongly correlated with secularity: there are plenty of religious fundamentalists who are also millionaires.

As has already been noted, education does not in fact explain secularity any more now than in the 90s. On the other hand, wealth, material security and life expectancy have become less potent correlates of secularity now than they were at that time. How could determinants of religiosity/secularity change so rapidly in only a decade?

For the last few thousand years, religion has been the predominant worldview of a mostly illiterate human population and, as such, it was the prime source of personal dignity and of understanding the world and humanity's place within it. Religion makes sense of people's lives, gives them a reason for living, a sense of past and of future, and a cosmogonic and moral framework. Religion has never been merely a knee-jerk emotional reaction to material despair. Rather, uneducated people have believed in religion to a large degree because they lack scientific knowledge. But it takes more than simple exposure to modernity for most people to embrace a secular worldview. It takes a level of education that mentally equips them to absorb a scientific worldview, and then it takes actual exposure to such a worldview. This proposal is supported by recent within-country research: for instance, atheists in America are not only more educated than religionists, but they are more knowledgeable about religion itself (US Religious Knowledge Survey, 2010). Religion probably appears to most religionists in the world today as the best worldview primarily because it is the only worldview available to them.

The modern (scientifically informed) worldview takes for granted that the origin of the universe is the desultory big bang, that the origin of life is a fortuitous mixture of a few bases, sugars and phosphates (DNA), that the apparition of humans is an opportunistic phylogenetic branching and that the human soul consists of nothing but reverberating circuits of the brain. This worldview also has no need for a transcendental arbiter or generator of morality. The modern concept of morality springs out of our raging, constantly changing and never ending psychological, emotional, political, social and economic debates. In this view the great Copernican revolutions of physics and biology killed the revealed God. However, the penetration of this worldview has only been possible recently in wealthy countries with good education systems and in liberal countries with well-developed and unhampered informal access to knowledge (e.g., internet, radio, cell phones, uncensored newspapers, full access satellite television, books) despite poor education systems.

Education explains why it has become increasingly difficult for scientifically minded people in the developed world to believe in gods. However, people in the developing world have also become conscious of the fact that "successful modernity" exists. Due to the globalization of information it is no longer hidden from their view. The appeal of modernity is that heaven could exist on earth if humanity can get a good enough grip on how the world works. To those accepting this worldview it becomes increasingly futile to place one's trust and hope in the afterlife when so much can be done to improve life on earth.

How, specifically, might education and the scientific worldview lead to declining religiosity? Ba'athist Arab regimes have been far more efficient at educating their populations than enriching them, a dynamic that is even more manifest in the ex-communist countries of Eastern Europe and the Asian socialist states of Vietnam and Cambodia. In all these cases, secularism was promoted by the state in the recent past. Another factor is that the globalization of knowledge has exploded through the internet and other telecommunications systems, meaning that people are now able to get a rather sophisticated education independently of the state and of personal wealth. There has also been a massive surge in demand for popularized, militant and scientifically inspired nonreligious perspectives such as those promoted by the "new atheism." The unabashed and even militant atheism of authors like Sam Harris, Richard Dawkins, Dan Dennett, and Christopher Hitchens has only recently turned out books that sell by the millions around the world. Another factor that may be contributing to this is that global education is developing and deepening far more rapidly than purchasing power is. In developed countries IQ grows by 3 points every ten years (Pinker, 2011).

Are there limits to secular modernity's success? Do better lives in "modern" secular countries

come at a certain cost? There is evidence to that effect in the present investigation. Secularity was positively correlated with alcohol and opiate consumption and suicide rates (from the UN and Suicide.Org). The most obvious reason why successful modernity is associated with higher rates of alcohol and opiate consumption is that populations with high purchasing power can afford these substances. Alcohol is the traditional psychotrope of Nordic countries, which are, as a whole, relatively secular. In addition, Muslim states and cultures actively repress consumption of alcohol. These countries are also often located in the southern hemisphere and are far less secular than northern countries. In the present database, "Northernmost latitude" was negatively correlated with "Church attendance" (r = -.494, p < .001, N = 66) and positively with "Alcohol consumption" (r = .229, p < .001, N = 166). Countries of the southern hemisphere have their own psychotropes like opiates, the stimulant khat, etc. However, opiate consumption was mildly yet significantly negatively correlated with religiosity in the present investigation. On the other hand, the present investigation found that the rate of transmission of infectious disease between humans (non zoonotic) was significantly higher in more religious countries, as was the abortion rate. Finally, tobacco smoking and HIV infection rates were unrelated to religiosity/secularity. Thus it remains unclear whether there is better prophylaxis against unhealthy behavior in religious or secular societies.

Suicide need not be viewed only as something abhorrent. In the modernist secularist utopia the good life is more important than life itself. That is why in a few of the particularly advanced secular states medically assisted suicide is not only legal, it is a state subsidized right. This is the case in The Netherlands, Belgium, Switzerland, Luxemburg, and parts of the United States. In many other "modern" countries citizens have a legal right to refuse treatment, including treatments that preserve life. There is also a link between the cold climates and low levels of seasonal sunlight in northern latitudes and increased rates of clinical depression and of suicide (Young et al., 1997). A Kendall's Tau-B correlation between "Suicide rate 2010" and "Northernmost latitude" was significant (r = .270, p < .001, N = 98). It would be a mistake to interpret high suicide rates in secular countries as a direct indicator of generalized despair. Gallup produced a cross-national "Index of happiness" in 2010. That index was significantly and positively correlated with secularity (Unimportance of religion, Gallup, 2010) in the present dataset (r = .380, p < .001, N = 140). Finally, the religiosity of countries does not appear to be associated with respect for life in general. In the present investigation, religiosity was significantly and positively correlated with infectious diseases transmitted by humans, with abortion rates, with capital punishment, with killings, with assassinations and with disappearances. Specifically, results of the present investigation refute the notion that the low suicide rates of religious societies can be explained by those societies valuing human life more, except perhaps valuing one's own life more.

The association of secularity with alcohol and opiate consumption and suicide is not something for secular modernity to celebrate. These two variables might contain precocious warning signs of forthcoming failures of secular modernity: overconsumption and loss of purpose. It remains to be seen whether modern secular countries will better succeed in tackling these two particular problems than religious countries.

References

Albrecht, S.L., & Heaton, T.B. (1984). Secularization, higher education, and religiosity. *Review of Religious Research*, 26, 43-58.

Armfield, G.G., & Holbert, R.L. (2003). The relationship between religiosity and internet use, *Journal of Media and Religion*, 2, 129-144.

Barber, N. (2011). A cross-national test of the uncertainty hypothesis of religious belief. *Cross Cultural Research* (epub ahead of print)

Barro, R., & McCleary, R.M. (2003). Religion and economic growth across countries. *American Sociological Review*, 68, 760-781.

Barro, R., & McCleary, R.M. (2005) Which countries have state religions? *Quarterly Journal of Economics*, 2005, 120, 1331-1370.

Barro, R.J., & Lee, J.W. (2010). A new data set of educational attainment in the world, 1950-2010. NBER Working Paper No. 15902. http://EconPapers.repec.org/RePEc:nbr:nberwo:15902

Beit-Hallahmi, B. (1988). The religiosity and religious affiliation of Nobel prize winners. Unpublished report.

Benson, P.L. (1992). Religion an substance abuse, In *Religion and Mental Health*, J.F. Schumaker (Ed.), New York: Oxford University Press, pp. 211–220.

Braun, C.M.J. (2011). Québec athée. Éditions Michel Brûlé, Montreal Qc, 466 pp.

Connoly-Ahern, C., & Golan, G.J. (2007). Press freedom and religion: Measuring the association between press freedom and religious composition. *Journal of Media and Religion*, 6, 63-76.

Dawkins, R. (2006). *The God delusion*. Boston: Houghton Mifflin.

De La O, A.L. & Rodden, J.A. (2008). Does religion distract the poor?: Income and issue voting around the world. Comparative *Political Studies*, 41, 437-476.

Dwyer, J. (1994). Parents' religion and children's welfare: Debunking the doctrine of parents' rights. *California Law Review*, 82, 1371-1447.

Fajnzylber, O., Lederman, D., & Loatza, N. (2002). Inequality and violent crime. *Journal of Law and Economics*, XLV, 1–40.

Filmer, D. & Pritchett, L. (1999). The impact of public spending on health: does money matter? *Social Science & Medicine*, 49, 1309-1323.

Fincher, C.I., & Thornhill, R. (2008). Assortative sociality, limited dispersal, infectious disease and the genesis of the global pattern of religion diversity. *Proceedings of the Royal Society- Biology*, 275, 2587-2594.

Fox, J., & Levin, J. (2000). *The will to kill*. Boston, MA: Allyn and Bacon.

Frazer, R. (1922). *The golden bough*. Abridged edition, edited by Robert Fraser for Oxford University Press, 1994.

Frejka, T., Charles, A.E., & Westoff, F. (2008). Religion, religiousness and fertility in the US and in Europe. *European Journal of Population*, 24, 5–31.

Gill, A., & Lundsgaarde, E. (2004). State welfare spending and religiosity: A cross-national analysis. *Rationality and Society*, 16, 399-436.

Gorsuch, R.L. (1995). Religious aspects of substance abuse and recovery. *Journal of Social Issues*, 51, 65–83.

Grim, B.J., & Finke, R. (2006). International religion indexes: Government regulation, government favoritism, and social regulation of religion. *Interdisciplinary Journal of Research on Religion*, 2, 1-40.

Halman, L. & Draulans, V. (2006). How secular is Europe? *The British Journal of Sociology*, 57, 263-288.

Hollinger, F., Haller, M., & Valle-Hollinger, A. (2007). Christian religion, society and the state in the modern world. *Innovation*, 20, 133-157.

Inglehart, R., & Norris, P. (2003). *Rising tide: Gender equality and cultural change around the world*. New York: Cambridge University Press.

Janssen, J., De Hart, J., & Den Draak, C. (1990). A content analysis of the praying practices of Dutch youth. *Journal for the Scientific Study of Religion*, 29, 99-107.
Jenkins, P. (2006). Demographics, religion, and the future of Europe. *Orbis*, 50, 519-539.
Jensen, G.F. (2006). Religious cosmologies and homicide rates among nations: A closer Look. *Journal of Religion and Society*, 8, 1-13.
Kaufmann, E. (2009).Islamism, religiosity and fertility in the muslim world. Paper presented at the annual meeting of the ISA's 50th annual convention "Exploring the past, anticipating the future", New York Marriott Marquis, New York City, NY, USA, Feb 15.
Kohut, A. (2010). *America's image remains poor: Concern about extremism*. Pew Research Center Report. A Kohut, President, Pew Research Center, R. Wike, Associate Director.
Larson E.J., & Witham, L. (1998). Leading scientists still reject God. *Nature magazine*, 394, 313.
Luck, D. (2006). Cross-national comparison of gender role attitudes and their impact on women's life courses. In H.P. Blossfeld and H. Hofmeister (Eds.), *Globalization, uncertainty, and women's careers*. Cheltenjham, UK: Edward Elger Publishing Ltd.
Lynn, R., Harvey, J., & Nyborg, H. (2009). Average intelligence predicts atheism rates across 137 nations. *Intelligence*, 37, 11-15.
Marx, K. (1843, reprinted in 1976). Introduction to a contribution to the critique of Hegel's philosophy of right. *Collected Works*, v. 3. New York.
McCleary, R.M., & Barro, R.J. (2006). Religion and Economy. *The Journal of Economic Perspectives*, 20, 49-72.
Müller, T. (2009). Religiosity and attitudes towards the involvement of religious leaders in politics.: A multilevel analysis of 55 societies. *World Values Research*, 2, 1-29.
Neeleman, J., & Lewis, G. (1990). Suicide, religion, and socioeconomic conditions: An ecological study in 26 countries. *Journal of Epidemiology and Community Health*, 53, 204-210.
Norenzayan, A., & Shariff, A. (2008). The origin and evolution of religious prosociality. *Science*, 322, 58-62.
Norris, P., & Inglehart, R. (2004). *Sacred and secular*. Cambridge: Cambridge University Press.
Paul, G. (2005). Cross-national correlations of quantifiable societal health with popular religiosity and secularism in the prosperous democracies: a first look . *Journal of Religion & Society*, 7, 20-26.
Paul, G. (2009). The chronic dependence of popular religiosity upon dysfunctional psychosociological conditions. *Evolutionary Psychology*, 7, 398-441.
Pinker, S. (2011). *The better angels of our nature: Why violence has declined*. New York: Viking.
Rees, T. J. (2009). Is personal insecurity a cause of cross-national differences in the intensity of religious belief ? *Journal of Religion and Society*, 11, 1-15.
Stack, S. (1983). The effect of religious commitment on suicide: A cross-national analysis. *Journal of Health and Social Behavior*, 24, 362-374.
Stark, R., & Bainbridge, W.S. (1985). *A theory of religion*. New York: Peter Lang.
Tylor, E. (1871). *Primitive Culture*. New York: J.P. Putnam's Sons, 1920.
U.S. religious knowledge survey. (2010). Research Report, Pew Research Center's Forum on Religion & Public Life.
Verbakel, E., & Jaspers, E. (2010). A comparative study on permissiveness toward euthanasia. *Public Opinion Quarterly*, 1, 109-139.
Verweij, J., Ester, P., & Nauta, R. (1997). Secularization as an economic and cultural phenomenon: A cross-national analysis. *Journal of the Scientific Study of Religion*, 36, 309-324.
Working Group on the Declaration on the Human Environment. (1972). United Nations Environment

Programme - Annex I. *United Nations Conference on the Environment*. Presented at the United Nations Conference on the Environment, Stockholm, Sweden. Retrieved from http://www.unep.org/Documents.multilingual/Default.asp?DocumentID=97&ArticleID=1501&l=en

Wuthnow, R. (1977). A longitudinal, cross-national indicator of societal religious commitment. *Journal for the Scientific Study of Religion*, 16, 87-99.

Young, M.A., Meaden, P.M., Fogg, L.F., Cherin, E.A., & Eastman, C.I. (1997). Which environmental variables are related to the onset of seasonal affective disorder ? *Journal of Abnormal Psychology*, 106, 554-562.

Zuckerman, P. (2009). Atheism, secularity, and well-being: How the findings of social science counter negative stereotypes and assumptions. *Sociology Compass*, 3, 949-971.

Zuckerman, P. (2008). *Society without God*. New York: New York University Press.

Appendix of Abbreviations and Acronyms

AI = Amnesty international, CIA = Central intelligence agency, CIFP = Country indicators for foreign policy, CIRI = The Cingranelli-Richards Human rights data project, EIU = Economist intelligence unit, FH = Freedom house, HF = Heritage foundation, IFPRI = International food policy research institute, ILO = International labor organization, IMF = International monetary fund, INSCR = Integrated network for societal conflict research, IRFR = International religious freedom reports, ITU = International telecommunications union, PRC = Pediatric resource center, SIPRI = Stockholm international peace research institute, STC = Society for technical communication, STWP = State of the World Liberty Project, UN = United nations organization, UN-DESA = United Nations Department of economic and social affairs, UN-DP = Human development indicators, UN-WPP = World population prospects, UNICEF = United nations children's fund, UNODC = United nations office on drugs and crime, UPI = United press international, WB = World bank, WEF = World economic forum, WHO = World health organization, WVS = World values service